

POPULAR MECHANICS

MAGA

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Home Section**

48 Pages All About Houses . . . Model
Homes . . . Prefabs . . . Mass Housing
or Remodeling . . . plus hundreds of tips
Home . . . Financing Your



Amazing New Hair-Grooming Discovery!

It's Here!

NEW MIRACLE GROOMING AGENT—GROOMIX
—IN LUCKY TIGER 3-PURPOSE HAIR TONIC!

*Natural-looking, longer-lasting hair grooming
OR Your Money Back!*

Not a grease, not a cream . . . Contains amazing new Groomix, with lanolin. Groomix is an utterly new kind of grooming agent—not an oil, grease or cream. Keeps hair in place all day—yet never looking greasy, oily or "slicked-down."

New Lucky Tiger 3-Purpose Hair Tonic—with Groomix—will groom your hair evenly, completely, give it that natural lustrous look that every woman admires. No old-style cream or oil tonic can groom your hair so attractively—for so long!

Helps Control Scalp Bacteria . . . Tests at a leading university show Lucky Tiger controls scalp bacteria 150% as effectively as any leading cream or oil tonic. Kills on contact the P.O.* dandruff germ.

Conditions your scalp . . . relieves dryness, itching.

**Pityrosporum ovale*, a common cause of infectious dandruff.

Ask Your Barber
—he knows!

Test Lucky Tiger 7 Days—See For Yourself!

Use Lucky Tiger 3-Purpose Hair Tonic daily for one week. Unless you agree it grooms your hair better—longer—mail what's left to Lucky Tiger for full refund.

When You Wash Your Hair Use
LUCKY TIGER MAGIC DANDRUFF REMOVER SHAMPOO



Look at your hair... She will!



You can't have a high time on a low battery



Don't get thrown for a loss by a worn-out battery. First chance you have, make an end run to your Goodyear dealer's. He'll check your battery free with the portable, accurate Goodyear All-Purpose Tester. That's the sure way to catch battery troubles before they start. While you're there don't forget to ask about the Goodyear Dry Proof Double Eagle Batteries, too.

Goodyear, Battery Dept., Akron 16, Ohio

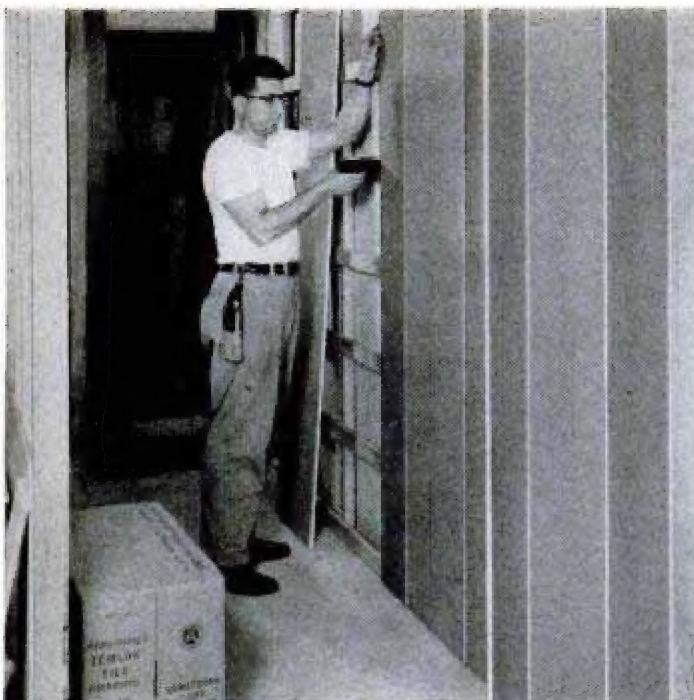


Double Eagle—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

GOOD YEAR

DRY PROOF • DOUBLE EAGLE BATTERIES

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—
THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network



Handsome walls of Temlok Plank go up quickly, easily



"Lok-Bevel" joint on Temlok Tile speeds application

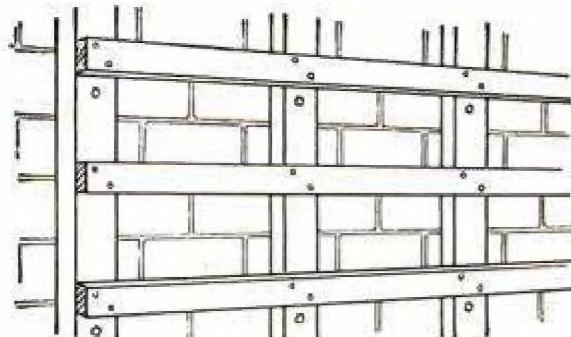
IT'S EASY TO FINISH YOUR BASEMENT WITH TEMLOK

Here's a practical way to convert your basement into an attractive room for work or play. You can do the job yourself quickly, economically, with Armstrong's Temlok Plank and Tile. Both materials are made with the "Lok-Bevel" joint which makes nailing or stapling extra easy. This special tongue-and-groove conceals the nails or staples, insures a neat, professional looking joint. You'll be proud of the results.

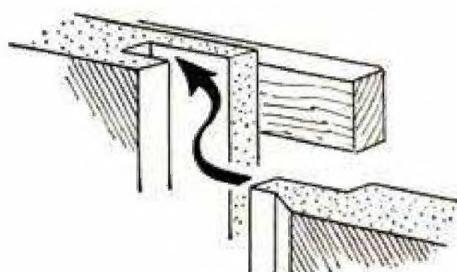
What's more, you don't have to paint Temlok. It comes already finished with two coats of good-looking, durable paint. Temlok is a wood fiber insulation board. It will help keep your basement comfortable.

Temlok Plank for walls is made in a handsome "Suntan Blend", in 8", 12", and 16" widths, and up to 12' lengths. Ceiling tiles come in White or Light Ivory, either plain or perforated. Sizes are 12"x12", 16"x16", and 16"x32".

Ask your local lumber or building supply dealer to show you samples of Temlok and help you with your plans. For free booklet, "New Ways to Remodel Your Home," write Armstrong Cork Company, 3710 Watch Avenue, Lancaster, Penna. 



Anchor wide flat side of 2"x4" studs against the foundation, two feet apart. Nail 1"x3" furring strips 12" apart over studs and finish with Temlok Plank. Cross-furring behind Temlok provides air circulation. Small vents at top and bottom carry off basement moisture.



This special joint on Armstrong's Temlok Tile and Plank provides a wide nailing flange and speeds installation. Nailheads and staples are concealed by the adjoining piece of material.

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Temlok® • M-67 Monowall® • CUSHIONTONE® • Insulating Wool • Hardboards

Popular Mechanics Magazine

Registered in U. S. Patent Office and Canada

H. H. WINDSOR, Founder

H. H. WINDSOR, JR., Editor and Publisher



this month's cover

DON AND JANE Engelhard, newlyweds now living in Oak Park, Ill., are house-hunting in typical husband-and-wife fashion on our cover. The workshop of a model home has caught Don's eye but Jane is determined he'll see the well-planned kitchen first. Just before the Engelhards were graduated from Beloit College, Beloit, Wis., they wrote the editors of this magazine a letter requesting information that would help them in planning a home. On page 144 you'll find their letter, along with our reply in the 48-page housing section that follows. This special section, which features the work of leading United States architects, designers and builders, will answer a good many questions of all the Dons and Janes who are house-planning or house-hunting. You will meet Don and Jane in various places in the housing section as they look over some of the best-planned, most attractive houses of today.

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Other items, and manufacturers of available products described, are listed on pages 16, 18 and 20

***Man with
stapler beats
man with
glue 10 to 1***



...and cuts fastening costs 70%!

This carton-sealing race took place in a rubber products plant—the man at left using glue, his companion sealing 10 times faster with a Bostitch Autoclench Stapler.

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If you are responsible for buying equipment, call the Economy Man nearest you. If not, tear out this page and take it or route it to the man who is. Every day's delay may mean more money down the drain.

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I want to fasten:

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|----------------------------------|---------------------------------------|---------------------------------|----------------------------------|
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| <input type="checkbox"/> rubber | <input type="checkbox"/> light metals | <input type="checkbox"/> fabric | <input type="checkbox"/> roofing |

Name _____

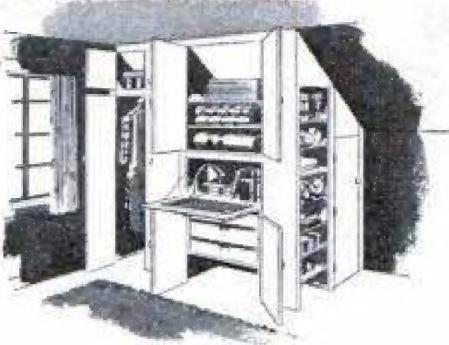
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City _____ Zone _____ State _____



1. Flexible Storage Wall. Simplicity of construction, adaptability mark this striking plywood built-in. Sections can be added or subtracted to fit your wall space. Cost of fir plywood needed to build unit shown.....\$105*

2. Under-Eave Storage makes good use of usually wasted space. Unit can be made to fit any ceiling slope, has ample space for clothes, bedding, bulk storage. Cost of fir plywood only.....\$95*



3. Shelf-Door Wardrobe saves space by combining features of roomy closet, chest of drawers and dresser. Paint it in bright accent colors or stain to feature natural plywood grain. Cost of fir plywood only.....\$55*

8

WAYS to get MORE ROOM in your home
with low-cost fir plywood built-ins

PLANS

AVAILABLE

HERE are eight new ideas for modern, space-saving built-ins that will pay you big dividends in comfort, convenience and livability. Each of these built-ins gives you neat, compact storage... crisp, modern beauty... far more *usable* floor space. And they're such an inexpensive luxury. See how little you pay* for the fir plywood you'll need to enjoy these space-thrifty built-ins in your home.

Fir plywood is light, strong and very easy to use—even for "week-end" carpenters. When you plan your built-ins with these large, light real wood panels, you have complete choice of

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PlyPanel® grade fir plywood is most useful for dozens of indoor building and remodeling jobs. Use quality-tested PlyPanel where only one side of panel is seen. Other fir plywood grades for uses where both sides of panel will be seen.

ASK FOR DFPA-INSPECTED FIR PLYWOOD



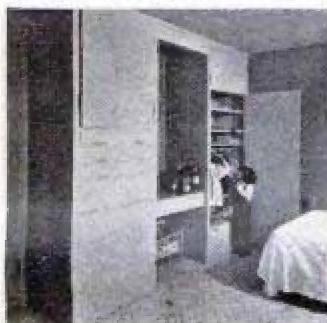
4. Sectional Storage Units can be combined to form shoulder-high storage wall for living room or den. Build it with fir plywood for only.....\$90*



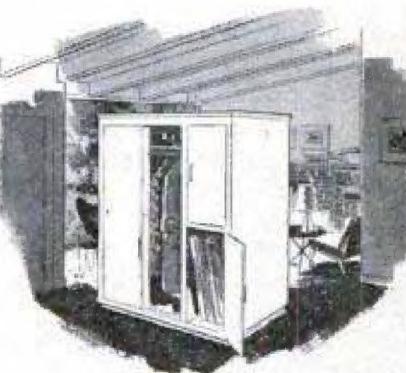
6. Island Entry Wall defines entry and living areas without confining either. Entry closet and space for bulk storage is on one side; cabinets and shelves on the other. Cost of fir plywood you'll need to build it.....\$100*

7. Odds and Ends Cabinet can be built in a few hours with easy-to-use plywood. Use it in bathroom to reclaim wasted space above water closet...in kitchen or utility room for extra storage space. Fir plywood for this handy cabinet costs.....\$8*

5. Child's Storage Wall has ample room for toys, clothes, bedding. Clothes pole, desk can be raised as child grows. Tough fir plywood doors and drawers can't be hurt by children at play. Fir plywood for this practical built-in only.....\$80*



8. Demountable Music Wall is made by stacking simple interchangeable plywood boxes on low plywood table. Note clean, simple lines. Boxes hold radio, record player, television and record albums, can be arranged to fit any room. Fir plywood you'll need to build it costs.....\$60*



*Based on latest available Chicago retail sales for fir plywood compiled by leading trade magazine, prices may vary throughout nation depending upon location and source of supply.

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- ✓ GARAGES
- ✓ CAR DEALERS

Look for The
BIG RED M



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But that's just another popular misconception.

Actually the regular use of Macmillan RING-FREE Xtra Heavy Duty Oil prevents *hydraulic valves from sticking* and more than pays for itself in the gasoline it saves!

LOOK AT THESE FIGURES:

Average oil drain.....	1500 miles
At 15 miles per gallon, gas consumed... 100 gallons	
8% saving on 100 gallons gasoline.... 8 gallons	
Gasoline average cost*... 28.63 cents per gallon	
Savings (8 x 28.63¢).....	\$2.29

*Includes premium and regular grades.

This \$2.29 more than pays for your oil
drain of 5 quarts at 45¢† per quart.

†Slightly higher in some areas.

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Start using Macmillan RING-FREE Xtra Heavy Duty Oil because it does such a wonderful job of cleaning. But keep on using it—month in and month out—because it reduces friction inside your engine, *prevents hydraulic valves from sticking*, saves wear and tear and repair bills, makes your car stay newer longer *and more than pays for itself in the gas it saves!*

R. S. Macmillan President

MACMILLAN PETROLEUM CORPORATION
530 W. 6TH STREET, LOS ANGELES
624 S. MICHIGAN, CHICAGO 50 W. 50TH, NEW YORK

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in this corner.....
**THE
EDITORS**



Meet the Skipper

When we send him up in one of these newfangled airplanes, our western editor, Thomas E. Stimson, Jr., of Los Angeles, is often very shy. There is some uncertainty



in his mind about the future of aviation. But he had no qualms about crossing the Pacific under water when we dispatched him to Pearl Harbor for a submarine ride. He tells of his trip on the *Segundo* in his story, "On Patrol With a Killer Sub," on page 97.

To the Editor:

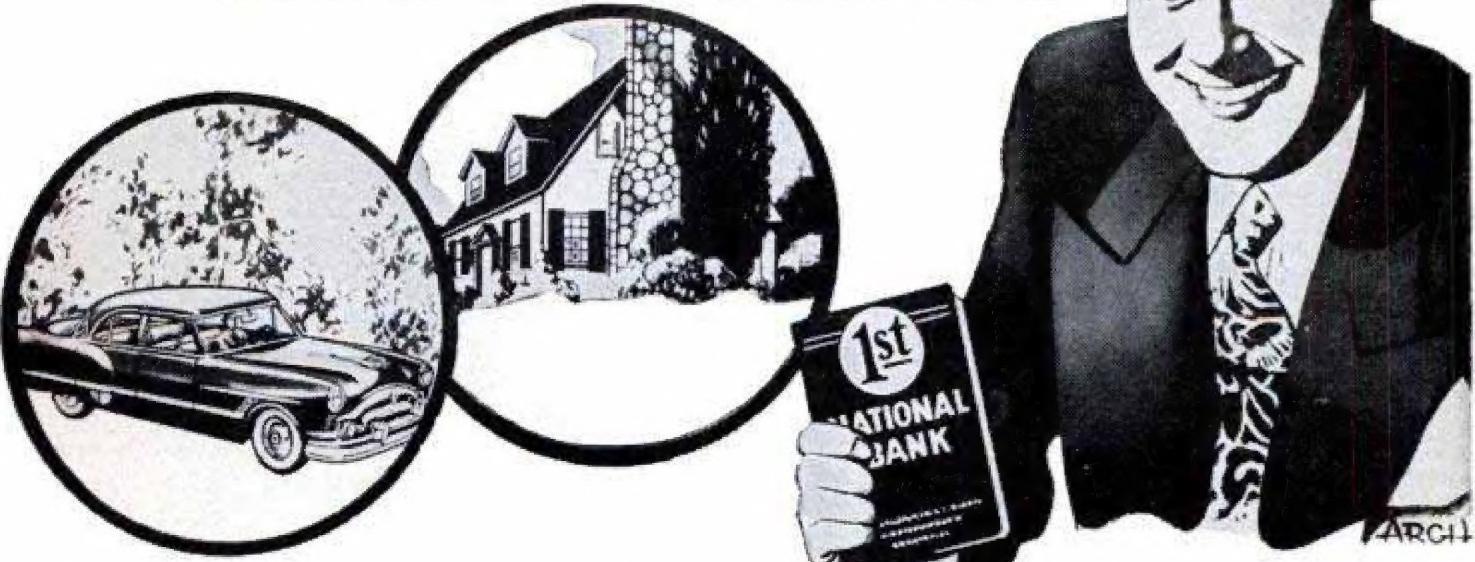
Guaranteed to call and gather cattle, an electric auto horn which simulates the deep tones of a bellowing bull is among the mechanical timesavers available to today's



cattlemen. The horn was originally designed as a truck fog horn and warning signal, complete with variable pitch and

(Continued to page 10)

5 reasons why ACCOUNTANCY



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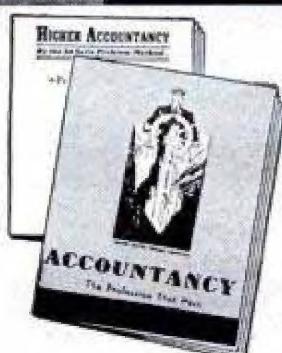
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OCTOBER 1953

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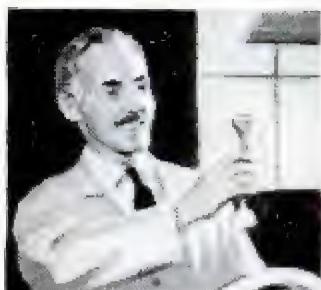
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(Continued from page 6)

volume control. Then a cattle buyer of South St. Joseph, Mo., V. F. Wright, discovered that the horn renders an impressive imitation of a bull's bellow and will call cattle, who quickly respond to the roar and gather around the vehicle.

Caroline V. Allen,
Burbank, Calif.

To the Editor:

I wondered if some of your readers might be interested in seeing an 18-inch model of the SS United States [built from plans in *Popular Mechanics*, December 1952]. We decided upon a smaller version because of the space available for a model ship.

Construction was started January first and the enclosed photo shows the model near completion in March after approximately 150 hours.



Doyle compares his 18-inch model with the original *Popular Mechanics* model of SS United States

The hull contains some 600 portholes made from $\frac{1}{16}$ " o.d. tube cut to length and pressed in place. Practically all of the superstructure was made of .012-inch-brass sheet with portholes, passageways and windows punched out with tool steel.

Lifeboats were individually carved and suspended from davits fabricated from $\frac{1}{16}$ -inch-o.d. copper tube. Hooks and eyes to fasten the boats were made from .010-inch-diameter wire.

I believe this was the best and most complete series your magazine has made available thus far and sincerely hope that similar projects are in the offing.

Richard H. Doyle III,
Des Plaines, Ill.

(Continued to page 14)

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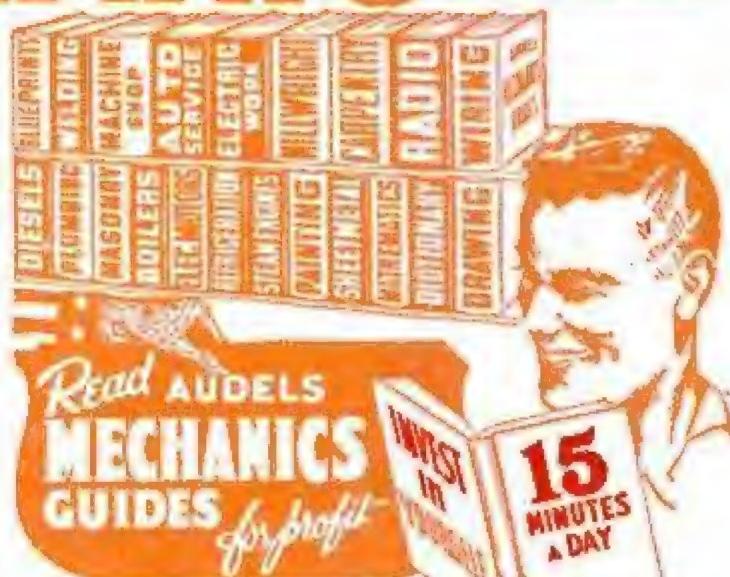
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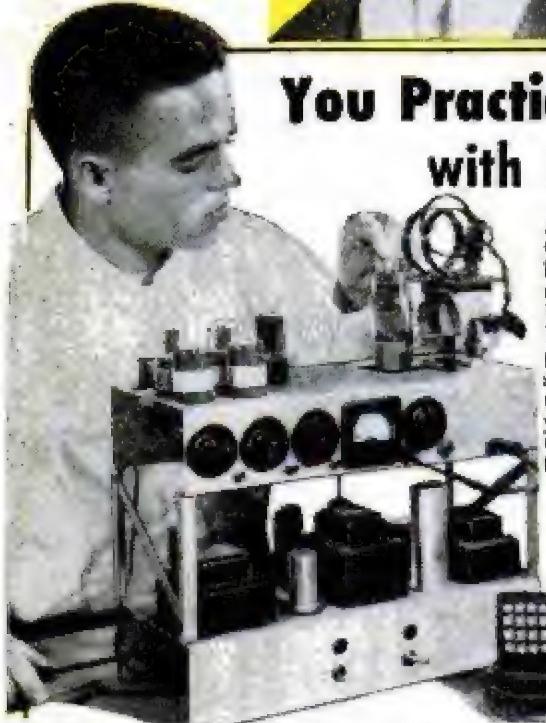
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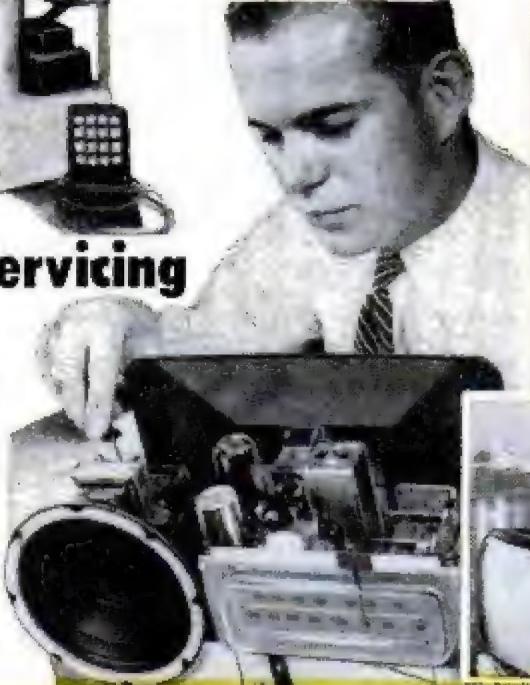


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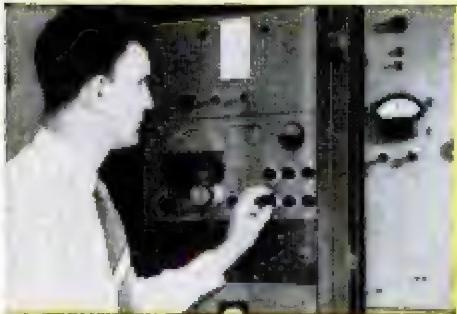
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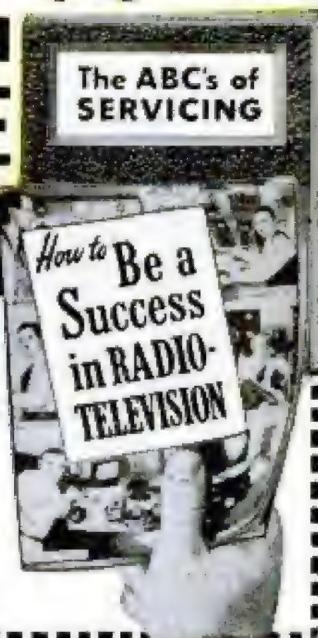
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(Continued from page 10)

To the Editor:

With reference to the June 1949 issue of your magazine and the article concerning models of the projected new bridge from



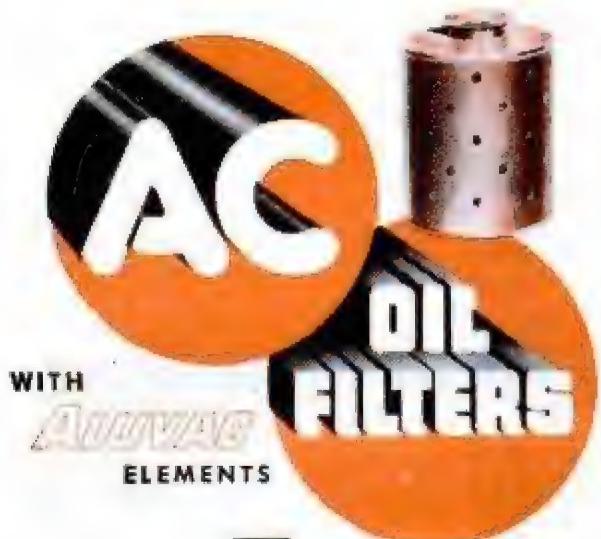
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Owe Victorsson,
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To the Editor:

This smoking stand is made from a tree which grew in Whitman, Mass. There are ten right angles in it; it is 21 inches tall. I cannot find out what kind of a tree it was. The wood is yellow and medium hard.

Fred Hunter,
287 Pine St.,
Whitman, Mass.



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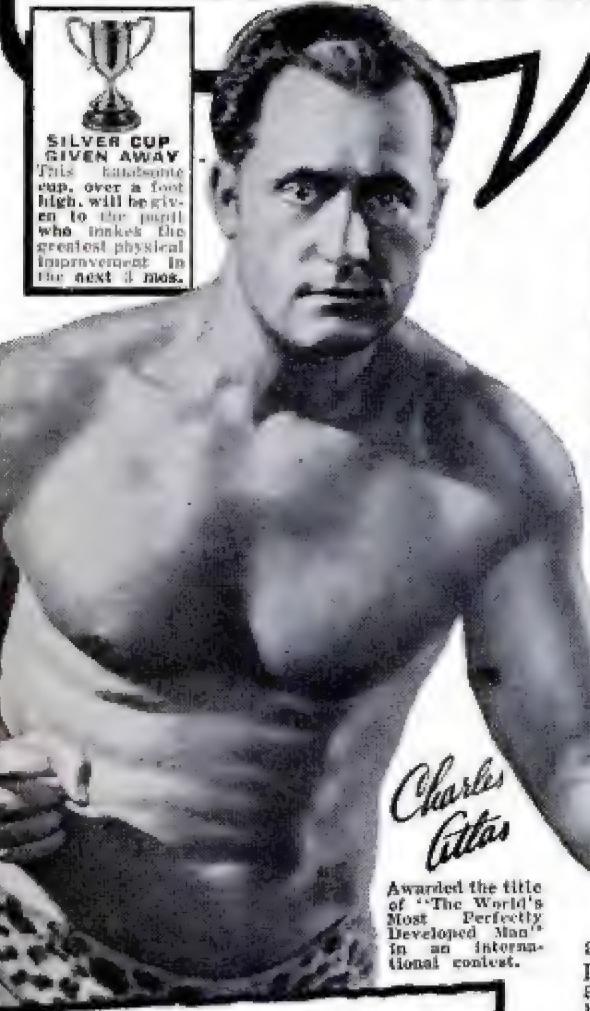
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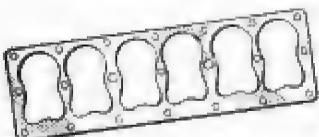


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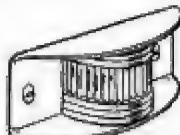
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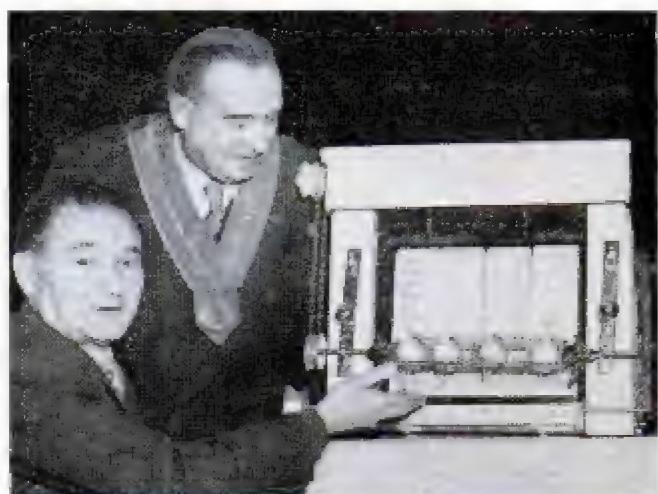
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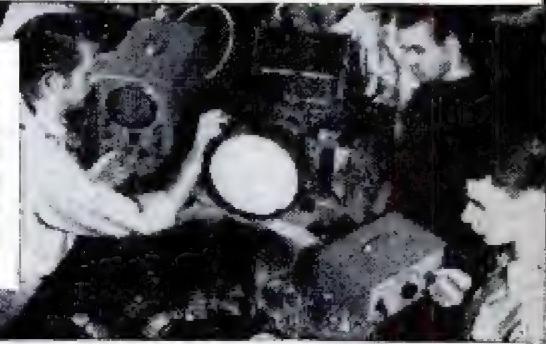
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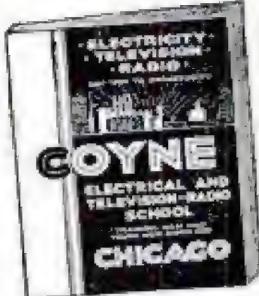
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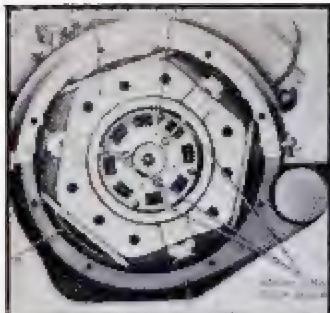
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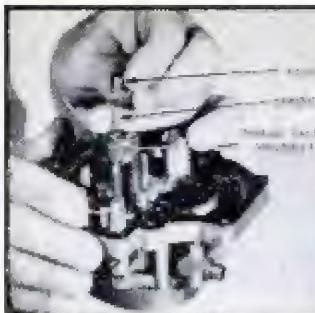
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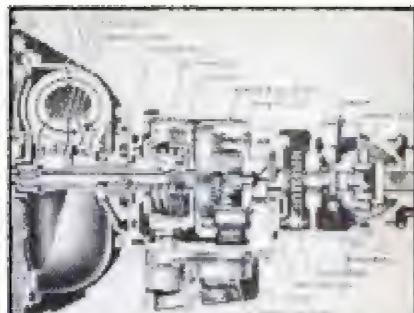
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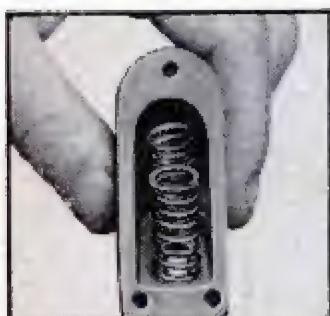
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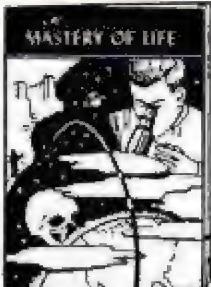
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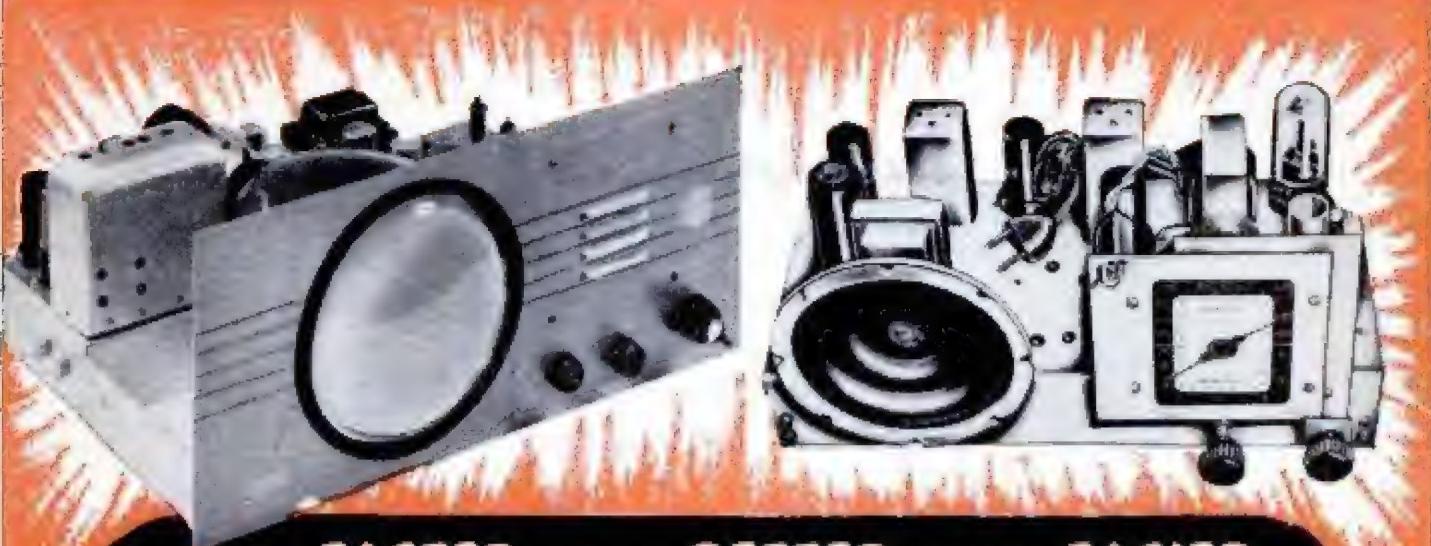
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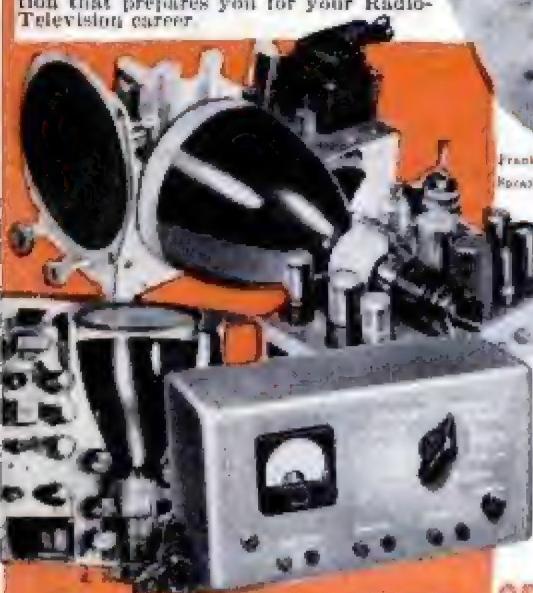
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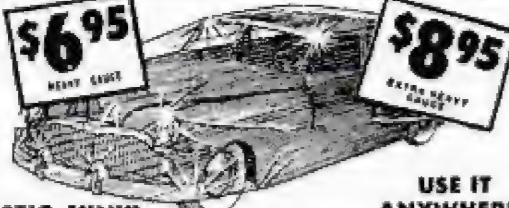
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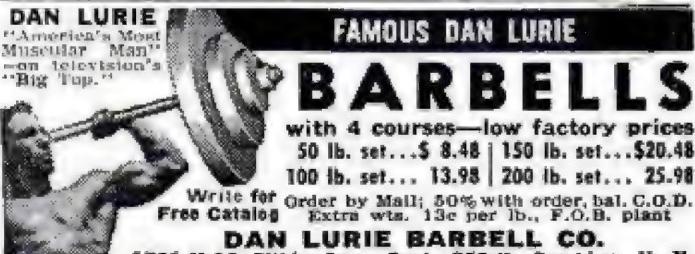


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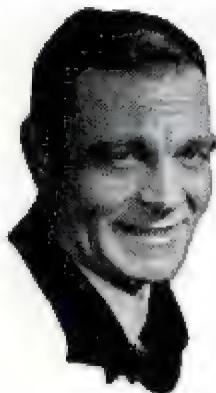


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TODAY almost everyone needs extra money. Increased taxes and increased living costs are making your dollar worth less and less, so you have to have more and more dollars just to keep even. There are lots of good ways to make extra money. I don't say my way is the best. I do say it's one of the easiest and most pleasant. It even leads to making new friends. It doesn't call for house-to-house canvassing, either. Let me explain:

I am Sales Manager for a very big manufacturing company. We make Stainless Steel Cooking Utensils. We do an enormous business with hotels, restaurants, hospitals, and institutions. We also make utensils for the Army, Navy and Air Force.

As a result, we have very low manufacturing costs. We can sell a set of Stainless Steel Cookware for home use for about what it costs some companies to make it! In fact, for years we did sell to one Sales Organization who resold our cookware house to house under their own name. They got \$120.00 for the same set that our people sell for approximately half of that.

You've probably heard of salesmen who give dinner parties in homes and then take orders from the ladies who attend. These salesmen have to get a high price because it costs money to give parties—he has to make his share—and his supervisor has to make his. The sales organization adds a profit and the manufacturer has to make his. So there are about four or five profits added to the actual manufacturing cost.

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You see, Stainless Steel is not a coated or plated metal, like chromium plate on the bumper of your car. That chromium plate can chip or wear off and exposes the raw steel underneath. Then the steel rusts. But our kind of Stainless Steel is stainless all the way through. It can't chip, crack, peel, or wear off. You could use a set the rest of your life-time and then give it to your children and it would still be good for their children.

Well, I figured that if the price was low enough every family could afford Stainless Steel Carlton Ware. So I worked out this plan! We would sell a complete set of 15 pieces at a figure that would include our profit. Then you add your profit and re-sell this set to your friends and neighbors for just about half of the usual price charged on the "party plan." They are glad to get such a bargain and they feel that you've done them a real favor.

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if you can get the same low prices for them. Then their friends call you and their friends' friends. It goes on and on!

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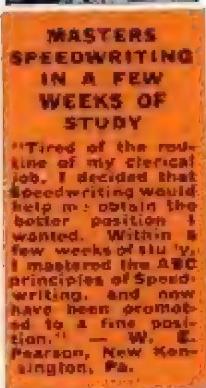
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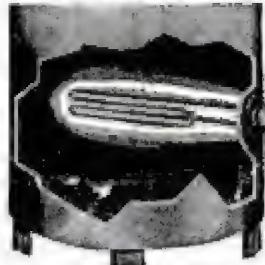
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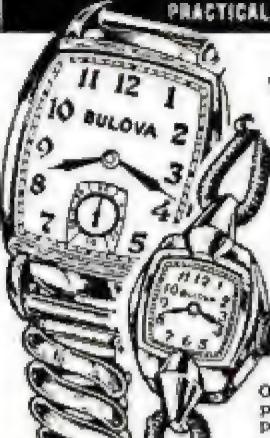
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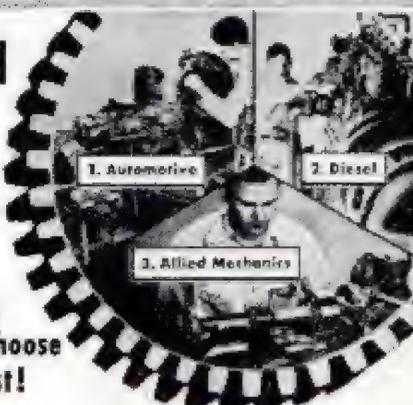
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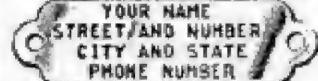
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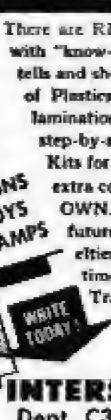
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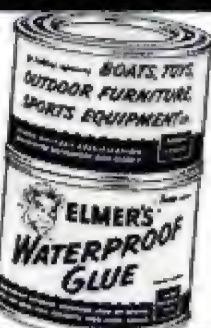
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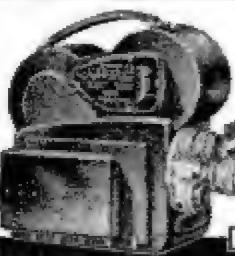
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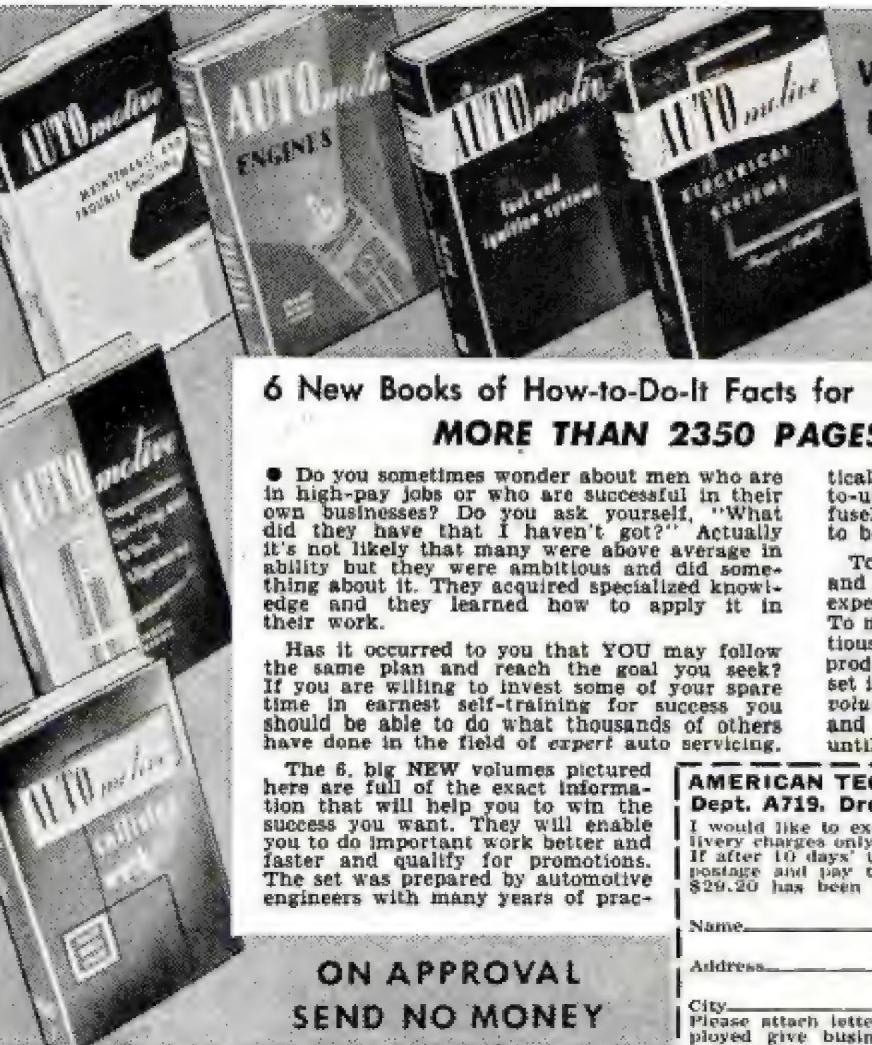
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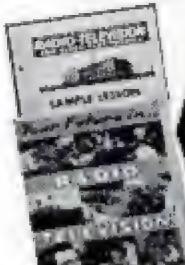
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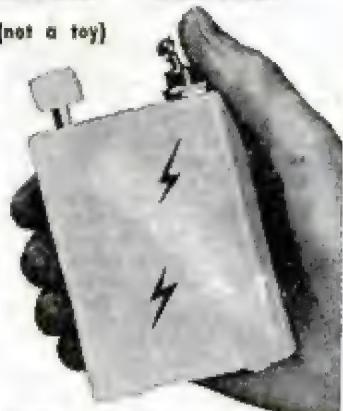
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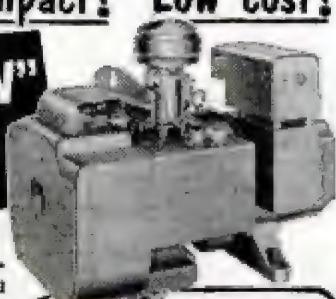
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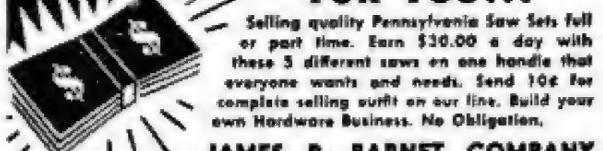
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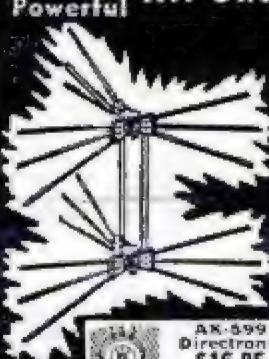


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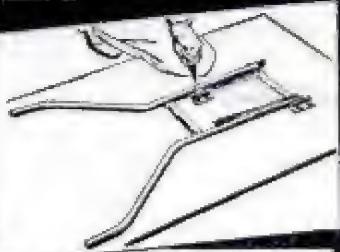
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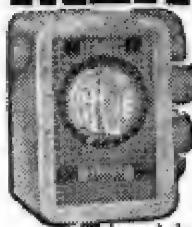
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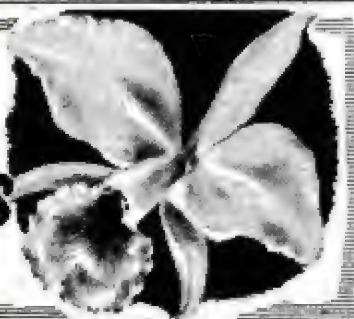
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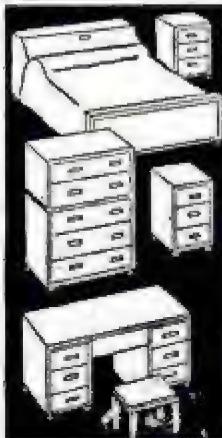
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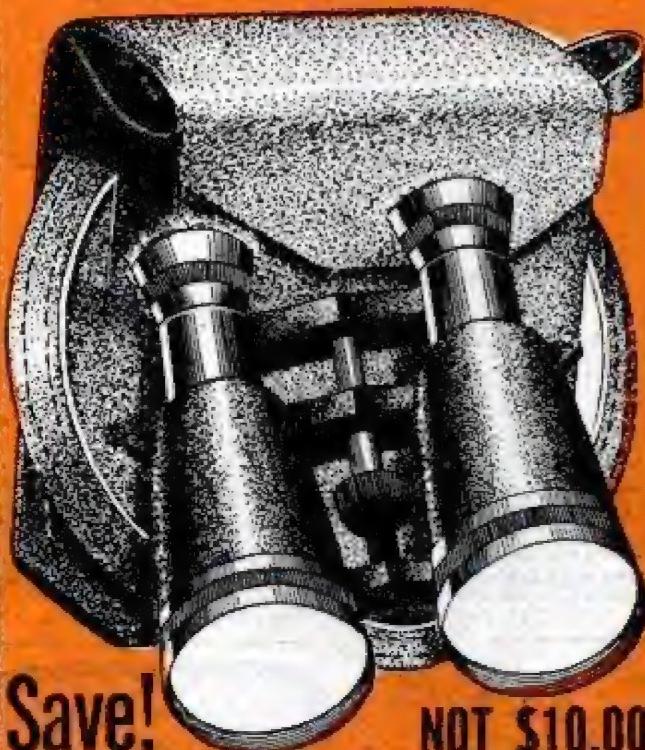


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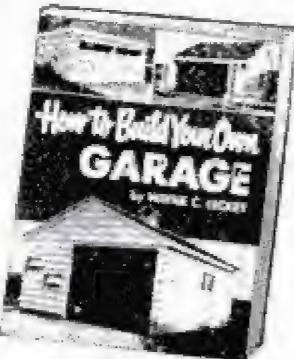
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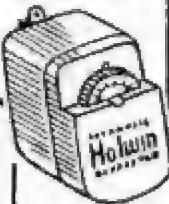
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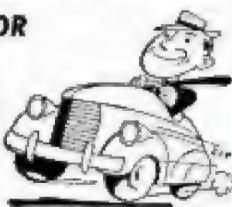
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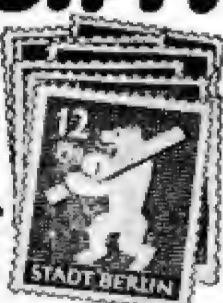
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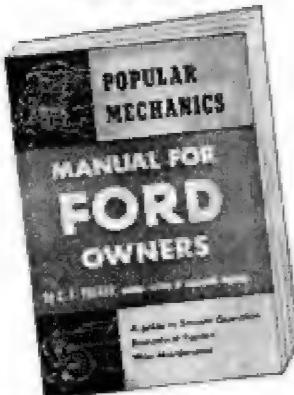


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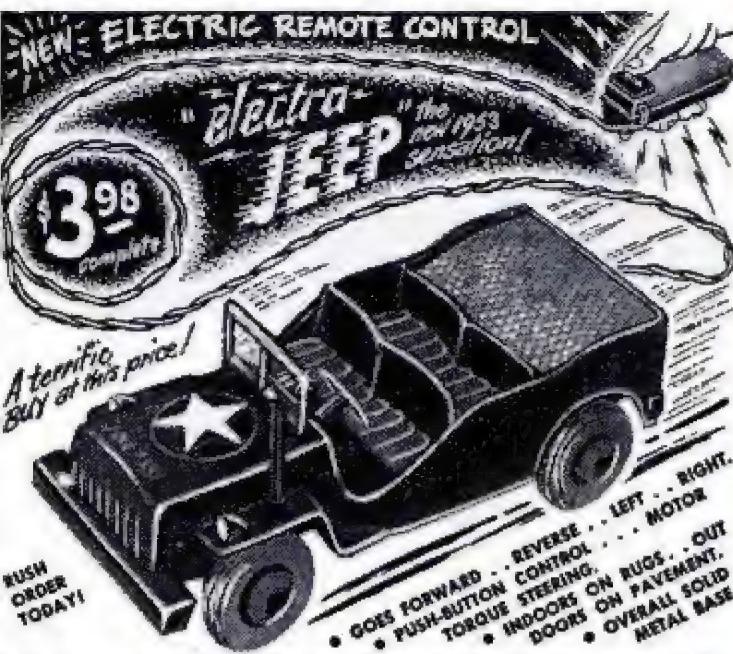
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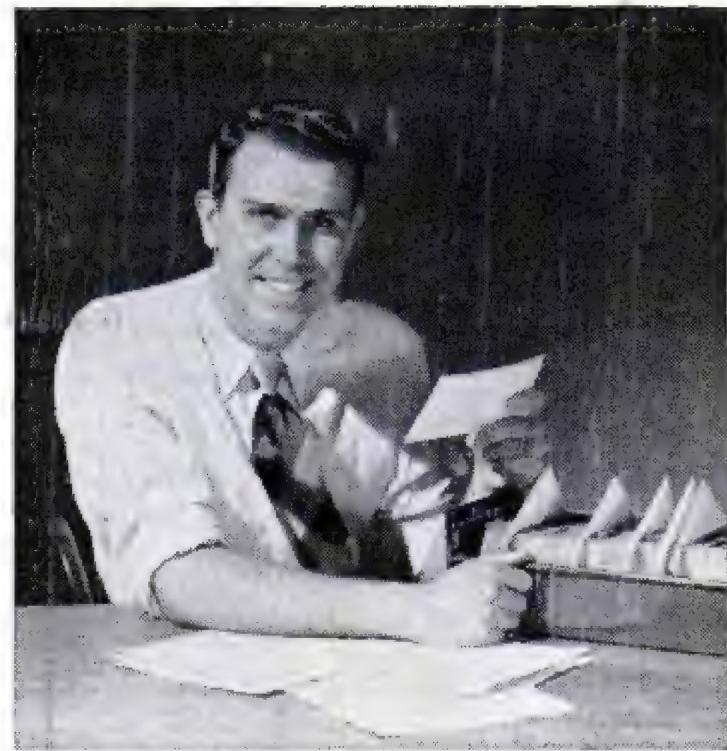
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FREE Details! Home operated mailorder business. Successful beginner's plan. Everything supplied. Lynn, 10420-M National, Los Angeles 34, California.

VENDING Machines — No selling. Operate a route of coin machines and earn amazing profits. 32-page catalog free. Parkway Machine Corporation, Dept. 72, 715 Ensor St., Baltimore 2, Md.

FLEXIBLE Rubber moulds for plaster and Marblite figurines. Sample and large illustrated catalog 25c, refunded on first order. K-C Novelties, Dept. 73, Easthampton, Mass.

50 HOME Mail business plans! Proven money-makers! Personal help assures success. Verdo, B-37A, Huntsville, Missouri.

UNUSUAL Opportunity. Sell by mail—Books, merchandise. Complete setups. Write Sherron, Box 943P, Bloomfield, N. J.

BOOKKEEPERS. Increase earnings operating sensational bookkeeping service. Kern, 4942 Vineland, No. Hollywood, Calif.

FLORIDA Opportunities! Hundreds of jobs, businesses, farms, groves, homes. Free details: Florida Opportunity Bulletin, Box 456-N14, Coconut Grove, Miami 33, Florida.

LEFT 8 Hour job to take 14 hour, and love it! Working for myself, at home, it's different. Special mailorder procedure we developed (spot-mailings from different points over United States) allows me much leisure, and double enough to live on. I'm showing others how. Write: Clives, 2834 W. 65th, Chicago 29, Illinois.

MEN-WOMEN! Make money at home. Exciting new ideas, plans assure big earnings. Drake, 136-A Walmer Road, Toronto, Can.

PEOPLE Write us they'd like to live as we do, rural, tranquil, with our home business, and money coming daily in the mail, and would we show them how? Yes. If you have capital, at least for postage and mail-order circulars, we'll get you safely started. Inquire: Craig, Southern Pines, North Carolina.

EARN Money with typewriter—Sewing machine! Details free. Edwards, 3915-PM 12th, Des Moines 13, Iowa.

ESCAPE Wage slavery. Easily. Operate your own profitable lifetime business. Free literature. Corley, H186 Ackerman, Clifton, New Jersey.

HAVE Home mail business—Get \$10 orders in every mail. Keep \$8.00. Everything furnished. Hutchinson, 401-A Adams, Dorchester 22, Mass.

OPERATE Your own profitable mail-order business. Full or part time basis. Write Vernon-Hall, Box 193M, Abington, Penna.

WANTED! Home producers, by manufacturers in our clearing house service. Become a sub-contractor, casting plastic products for these companies. Thousands of easy-to-make items required for consumer and industrial use. Cash in at home, without previous experience. Write Plastic Service Associates, Dept. PM9, East Boston 28, Mass.

MAKE Money selling merchandise by mailing cards. Paton, Box 55-E, New York 23, N. Y.

ASK Your wife if you love your job. She knows. Then write me about the mailorder method I perfected in 1929, that's dropped \$1,000 into my mailbox every month since, that lets me stay home and enjoy life working for myself. I'll help you start. Rotoletter, 1180 Seward, Detroit 2, Mich.

FREE Vending machines; if used to sell our profitable nuts. Continental, Box 1361-A, Milwaukee 1, Wisconsin.

BOOKKEEPERS. Keep books, small firms spare time. Manual latest technique by C.P.A., \$3.00. Modern Business, Box 406, Youngstown 1, Ohio.

FREE Booklet — "How to Make Money by Raising Fishworms." Please include 25c for postage and handling. Flint River Worm Farm, Reynolds 5, Georgia.

MINIATURE Trees — Why pay \$2.00-\$5.00 for growing secrets? Free details. Bassett, Dept. B, 5038 N. Winthrop, Chicago 40.

BUY Wholesale — Thousands nationally advertised items. Save, make money! Free details. Durex Co., Box 672-B, Chicago 90, Ill.

DON'T Fall to read our advertisement under Moneymaking Opportunities. Protec-to Products Company, Box #543, Oak Park, Illinois.

MONEYMAKING OPPORTUNITIES

SHINE Shoes without polish. New invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee, 179, Akron, Ohio.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work home! Start spartan Deumont Surveys, Kentmore 23-R, N. Y.

TYPEWRITER Owners, make handsome profits. Write today, now. Groves Company, 632, Hastings 8, Nebraska.

START A buying service, buy wholesale thousands nationally advertised products. Make big profits selling at sizable discounts. Postcard brings details. American Buyers, 630-R Linden, Buffalo, N. Y.

FREE Folder! Make money—at home. Samuel Tell, Guaynabo, Puerto Rico.

LEARN Professional candy making. profitable home business. Details free. Pate, Kissimmee, Florida.

ONLY New moneymaker in years. Free details. Casecraft, 805-F Sunset Blvd., Los Angeles, Calif.

SECRETS Of moneymaking. Write Ahrens, Box 41, Roosevelt, N. Y.

BUY Wholesale! Nationally advertised products. Tremendous discounts. Particulars free! Econ-o-mart, Box 635B, Morristown, New Jersey.

FREE Samples, diagrams, instructions. New enormously profitable business. Send 25c coin for handling. Hobby, 243 S. Lexington, St. Paul 5, Minn.

"**HOW** To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address Cartoonists' Exchange, Dept. 910CM, Pleasant Hill, Ohio.

MAKE \$2600.00 A year spending 5 hours a week. Start at home. New machine. Small investment. Free booklet. A.X. Co., 442 N. Seneca, Wichita 12, Kansas.

EARN Money evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 1, Wisconsin.

DON'T Be Mr. Average Man. Operate your own business. New field, sensational sales potential, highly profitable. Very desirable, non-perishable, no chemicals or liquids. High-grade proposition for men not afraid of earning \$10,000 and up annually. Can you recognize real opportunity? Postcard will bring details. Protecto Products Company, Box #543, Oak Park, Illinois.

FREE! Complete mailorder business! Terrific profits! No investment. Write today. VitaMins, 2908-PM Beverly Boulevard, Los Angeles 57.

MONEYMAKING Deluxe opportunity packet. Only 10c. Don Supkow, Blackwood, N. J.

FREE Folder. Dozens of new, different ways to make money at home. Write, Pomona Publications, Box 357-B, Pomona, California.

FREE Folder! Make money at home. Samuel Tell, Guaynabo, Puerto Rico.

EXCEPTIONALLY Profitable home mail business opportunity. Write Lewis Barlett, Richland, Georgia.

MONEYMAKING Opportunities, home-work. Free literature. Wiese, 1516 Franklin, Waterloo, Iowa.

\$10,000 PROFITS! Your own mailorder business! No risk! Success plan free! Treasury, 709 Webster, New Rochelle, PM-16, N. Y.

STOP Shopping! See our complete catalog of spare time opportunities. Free. Rush postal. Lewis Enterprises, P.O. Box 2367, Portland 14, Oregon.

TYPEWRITER Owners. Make handsome profits. Get details today. Groves Company, 632 Hastings 8, Nebraska.

BEAUTIFUL Feather pictures. 200% profit! Free sample. Apartado 9036, Mexico 1, D.F.

WHOLESALE Services. (Bonded.) One-year, \$1.00. Rhipco, Box 5387, Tucson, Arizona.

"**MONEYMAKING** For the Millions" can help you. Get free details. Merit Mail Order, Montrose 1, Mo.

WHOLESALE Information. Circular, interesting magazine, dime. Zen Publishers, Elkhart, Ind.

HOW To earn up to \$500 for each script writing for television. New, different. Particulars free! Wonderful Products, Box 2113, Santa Fe, N. M.

HOUSEHOLD. Patented items for sale. Dr. Roberts, LakePark, Ga.

SELL Jewelry by mail. Big demand, every woman buys. Everything furnished. Eastern, Box 142-D, Dorchester 24, Mass.

CHURCHES. Women's clubs, receive \$100.00 to \$500.00 and 24-card tables. Unique plan. Pine Hill, New Jersey.

101 WAYS To make \$1,000 at home. Details free. Business Surveys, 365 S. Fairfax, Los Angeles 48, Calif.

IMPRINTS For homeworkers. Samples free. No obligation. Fowlico, Muncie, Ind.

HAVE Money-making home mail business. Complete idea. Mailbox service. Personal help assures success. NMD Agency, Box 88-A, Dorchester 22, Mass.

FREE Folder! How to make thousands yearly selling by mail the way that pays. Fuller, 92-A, Greenwood, Pocatello, Idaho.

MONEY With any type camera. City or country. Spare or full time. Complete details \$1. Lafferty, 2205 B, Brownwood, Texas.

FUTURE Security! Learn watch-clock repairing at home. Inquire, Modern Technical Supply, 56 PM West 42nd Street, New York 36.

BE Independent, be secure, have your own profitable business—Earn \$20.00 and more a day making beautiful, fast-selling lamps at home. No equipment needed. Illustrated course teaches you quickly. Course, parts catalog, wholesale price list—only \$2. Gearon Co., Dept. 200-B10, 27 S. Desplaines, Chicago 6, Ill.

START Your own business manufacturing driftwood lamps. Kit \$7.50. Sam Pachetti, 2187 N.W. 24th Court, Miami, Florida.

PLAIN Folks, we married on nothing—12 years later own properties, houses, lands. All from scientific mailorder routine, the coming method: only definite prospects receive our circulars, mailed by others on commission. Sales astonishing on modest operation—\$144,000.00 in 12 years! Commission Mailorder details free. Caldwell, Box 293, San Diego 12, California.

WOULD You see your boy in your job? Does the job satisfy? Inspire you? Bring \$1,000 paycheck? My modest home mailorder does. In 24 years I've learned to avoid mistakes, cut corners, conduct a profitable, satisfying operation. If desired, I'll help you start, guide you. Thomas Cummings, 3070 Felton, Salem, Oregon.

BORROWED \$45 For stamps and circulars. To date sold quarter million dollars—in small orders! All from home, by novel mailorder method where we supply circulars to mailers in certain key positions. Orders come automatically, average \$40 daily. Now we're showing others how. Details free. Hometrend, Marshall, Illinois.

PROFITS To \$5 hour! Engraving plastics titleplates; sensational new engraving, carving machine, Duplicater. Details, sample 25c. Desco Distributors, 6334-O Sepulveda, Van Nuys, Calif.

DIME Brings our nationally advertised opportunity packet. Rinehart, 235 Baltimore, Hanover, Penna.

BE Appointed notary public, your state. Thrilling experiences. Increased income. Men, women. Young, old. Write Box 3025, Dallas 1, Texas.

SELL Titania gems; 59.75 carat wholesale. More brilliant than diamonds. Free catalogue. Diamonite, 1404-M Mitchell, Oakland 1, California.

50,000 ARTICLES Wholesale. Source directory, dime. Nelko, Box 3462-DR, Chicago 54.

WIN Contest money. General Contest Bulletin gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests, 1809½ East 5th, Duluth, Minnesota.

FOUR Ways to increase your income at home. Free details. Dixie Mailers, King, N. C.

SCHOOL SENIORS—Sell classmates America's most beautiful graduation name cards. Largest selection. Highest commission. Outsell all others. Free sample kit. Printcraft, Dept. M, 1509 Maple Street, Scranton 5, Penna.

MONEY Found. Be our agent in your community. Top quality watches, diamonds, jewelry, etc., at wholesale prices. Amazing profits. No age limit. Experience unnecessary. Send for free catalog. Zerah Brothers, 602 Mission Street, Dept. 81, San Francisco 5, Calif.

READ Progressive Mailtrade, the magazine that tells how to make money by mail. Dime brings sample and special offer. Progressive Mailtrade, Box 357, Sheboygan, Wisconsin.

START A profitable subscription business in spare time! We need men and women (young or old) as representatives for all leading national magazines. Liberal commissions paid for new and renewal subscriptions. Start earning money in this pleasant work at once! Clip this ad and send with your name and address to: International Circulation Distributors, Dept. PM, Hearst Magazines, 250 W. 55th St., New York 19, N. Y.

FREE Book "505 Odd, Successful Businesses." Work home. Expect something odd! Pacific, Oceanside, Calif.

137 PLANS To make money, local mail-order. Details: Elite Co., 220 Grand St., New York 13.

PUBLISH Your own magazine. Handsome 52 page format, well edited, illustrated. Cost low as \$1.00 month. Brings you prestige, profits. 25c brings sample. details. National, Ord, Nebr.

SCHUHMACHER Matmakers. Convert old tires into dollars. Devote full or spare time. S and S Patents, Inc., 1307 North Clark St., Chicago 10, Ill.

MONEY Needed? Start home business. Grant Specialties, 721 28th, South Bend 15, Indiana.

PAUZE Liquid styptic stops bleeding quickly. Fast profits. Sampler 25c. Pauze, 1545-F Echo Park Ave., Los Angeles 26.

MAILORDER—Operate profitable home business using free advertising method reaching millions. Revealing information free. H. F. Seidel, 7070 Hollywood Blvd., Hollywood 28, California.

22 MILES Out of city I live, yet walk to work daily, to my office, a renovated barn 50 feet away! I planned it that way. We organized a home mailorder, a rare kind, branch-style. United States Postal Service approved. Grosses \$1,000 monthly. Organization duplicatable using other products. Inquire: Kerr, Gering, Nebraska.

FREE Information reveals secrets of unusual profitable home businesses. Rare opportunity. Home Business Surveys, 365 S. Fairfax, Los Angeles 39, Calif.

MAKE Money at home by mail. Fast, easy. Liebig Industries, Beaver Dam 4, Wisconsin.

FOREIGN Employment construction work. If interested in foreign projects with high pay, write Foreign Service Bureau, Dept. PM, Metuchen, New Jersey.

MAKE Cosmetics in your kitchen for own use or to sell. Easy, profitable, not seasonal. Ingredients available at drug stores. Twenty one formulas and instructions \$1.00. Moffet, 429 N. Gilbert, Danville, Illinois.

MAKE To \$4.50 hour doing common pen lettering. National Artists, 801½-A North Marsalis, Dallas 3, Texas.

DOUBLE, Triple, quadruple your income. Free information. Future Foundation, Pensacola 2, North Carolina.

EXTRA Income! Become a notary public! Complete details, your state, 50c! Flimer, 910 Marion, Pharr 10, Texas.

GET Facts—\$4.00 merchandise. \$2.00 treatise 100 money makers. \$6.00 value \$2.00. Kohne, 508 West 45th, Chicago 9.

FORMULAS, PLANS, ETC.

FORMULAS: Big demand, easily prepared, profitable. Free list. Wall, 304N 27th Street, Alabama City, Alabama.

EXCLUSIVE Formulas for manufacturing perfume compounds that are sales-tested and profit-making. None better at any price. Formula for reproducing a world famous perfume and brochure "Perfume Compounding" containing information not available elsewhere \$10. Fragrance Research Foundation, 1513 Oxford Way, Oklahoma City, Oklahoma.

PRODUCT Analysis, manufacturing formulas, processes developed. Moderate fees. Plastics, Box 1574, Boston 4, Mass.

FORMULA For protective hand cream now being offered for sale. Not a cleanser. Apply directly to skin surfaces before undertaking work involving inks, greases, paints, etc. Needs only water to remove. Simple to make and sell. Market wide open. Send \$1.00. Ottawa Engineering and Sales Company, Box 835, Creston Station, Grand Rapids, Michigan.

FORTUNES In profitable formulas. Far Hills, Box 544-MB, Dayton 9, Ohio.

FORMULAS: All kinds. Latest, best. Literature free. Kemikal, Park Ridge, Ill.

REAL Manufacturing formulas. Lists free. Cummings, Chemist, Gordon Ave., Syracuse 4, N. Y.

ANY Formula \$3.00. Chemical Instruction Sheet—catalog 10c. J. Belfort, 216 W. Jackson, Chicago 6.

FREE Formula catalog. Anything analyzed \$35. Western Chemical, Salem, Ore.

LABORATORY Tested formulas. Catalog free. Pont Chemical Company, Terre Haute 3, Indiana.

MODERN Formulas for many new and unusual business-building products. Fifty years supplying the best. Literature free! Liscumb Miller, Chemist, Tampa, Florida.

500 MONEY Making formulas, 25c postpaid. Allen, Dept. PMC, Clinton, Missouri.

ANY Formula, Jack, Consulting Chemist, 5138 Gainer Road, Philadelphia 31, Penna.

GENUINE Manufacturing formulas. Latest. Literature free. Nelko, 3462-P Merchandise Mart, Chicago 54.

PLASTICS

PLEXIGLAS. Lucite. Any size sheets, masked. Square foot (12 x 12) cost, 1/16", \$1.20; 1/8", \$1.40; 3/16", \$1.75; 1/4", \$2.00. Include 10% postage. Minimum order \$3.00. Almac Plastics, 600 Broadway, New York City.

REPAIR False teeth yourself! Special professional plastic. Guaranteed. Send only \$1.00. Grant Laboratory, 219 W. 17th, Los Angeles 14, Calif.

FIBERGLAS, Polyester, Plexiglas, Acetate, Vinylite; casting, coating plastics: My own Fiberglas "how" book now ready. \$1.50. Fast service, best prices. Catalog 10c. Airmailed 35c. Gem-O-Lite, Box 6867P, North Hollywood, California.

NEW Liquid casting plastic. Clear, color. Embed flowers, insects, coins. Saw, drill, carve. Send 25c for Castolite Creations Manual and proved success plan showing how to make money at home. Castolite, Dept. L-101, Woodstock, Ill.

PLASTICS Home-craft course for men and women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for free booklet. Interstate Training Service, Dept. DSK, Portland 13, Oregon.

SPECIAL Plastic for laminating photos, cards, etc. Send for prices. Solomson, 46 Cornhill, Boston 8, Mass.

HANDBOOK Plastic Information designs, fabrication instructions, material catalog, complete 50c. Plastic's, Box 1312, Salt Lake City, Utah.

UNUSUAL Christmas decorative materials fill our complete catalogue. Van Horn Plastics, 1905 Ingersoll, Des Moines, Iowa.

PLASTIC, Sheets, rods, tubes, etc. Free list. Plastic Supply Co., 3901 N. Grand Blvd., St. Louis 7, Mo.

PLEXIGLAS Sheets—Cut to size. Clear. All thicknesses. Standard outdoor translucent colors. McClarin Plastics, P.O. Box 168, Hanover, Penna.

DIRECTORY Of manufacturers, for liquid plastics, liquid rubber, wholesale. Castileco, 2130P, Paterson, New Jersey.

CHEMISTRY

IMPROVED Second printing, "Spectacular Chemical Fireworks Experiments" manual. Not mimeographed sheets. Contains complete formulas, set-ups, data, on thermits, fulminates, explosive powders, etc. Still \$1.00 postpaid. Chemi-Technik Laboratories, 668CG Riley, Buffalo 6, N. Y.

COMPLETE Catalog, 15c. Surplus lists. Laboratory Sales, Box 161-A, Brighton, Mass.

MERCURY, One ounce 50c, two 75c, five \$1.50. We pay postage. Nucleus, 1558 Miford Place, New York City 60.

CHEMICALS And apparatus for industrial, analytical, and private laboratories. Catalog 25c. Dept. M-30, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology. 10c. Tracey Laboratories, Evanston, Illinois.

NEW Idea chemical and apparatus outfit for home experimenting. Photo-scales, microscopes, chemicals, biological and laboratory supplies in small quantities. Catalog 25c. Established 1931. John H. Winn, 124A West 23rd Street, New York, N. Y.

SPECTROSCOPE For quick chemical analysis \$3.00. Kutting Sons, Los Altos, Calif.

AMAZING New book of science. Experiments, formulas and catalogue of laboratory supplies. Only 25c. National Scientific Co., Dept. 16, 2204 W. North Ave., Chicago 47, Illinois.

AGENTS WANTED

REAL Diamond rings. Sell direct. Make big middleman's profit. No investment. Experience unnecessary. Free catalog, details. Sternberg, 111C No. Columbus, Mount Vernon, New York.

EARN \$50 Weekly spare time. Sell vitamins. Emm-Bee, Box 992, New York 8, New York.

MIRACLE Profits in miracle plastics! Dishware, fabric textured drapes, gift-wares, rainwear. Over 200 fast-selling household items assures big spare-time profits. Thrilling catalog free. Loraine, 445-H Adams, Chicago 7, Ill.

SENSATIONAL High quality, low priced retractable ball pen, permanent ink. Extra refills free. Fast, profitable seller. 60c for sample refundable on first dozen order. Lucas Trading Co., 225-A Lafayette St., New York, N. Y.

ANY Gift shops can sell purses, belts and other handmade typical items from Guatemala. Free catalog. Use airmail. Mapilion, Box 268, Guatemala, G.A.

BE First to distribute our glamorous reversible spread and drape set. More than 100% profit in every sale. Every home a prospect. Write for free details. National Home Distributors, Dept. P.M., 210 Fifth Ave., New York 10, N. Y.

YOU Can make a fortune if you join us now. Sell sensational new \$4.25 non-electrical burglar alarm. Tremendous sales. Federal Products, Evanston 2, Illinois.

BUY Wholesale thousands nationally advertised products at big discount. Free wholesale plan. American Buyers, 629-R Linden, Buffalo, N. Y.

NEW Plastic mending tape. Just press on! Repairs clothing instantly. Lightning seller. Samples sent on trial. Kristee 125, Akron, Ohio.

SELL New automatic floor waxer. Trigger on handle. Retails \$2.95. Your profit 125%. Write Smith, Inc., Greenfield 7, Massachusetts.

FOG-Stop Windshield cloth. Instantly removes blurry mist, frost, sleet, snow. Stops windshield fogging. Samples sent on trial. Kristee 124, Akron, Ohio.

START Greeting card, gift shop from home. Display fascinating Christmas, all occasion cards. Big profits. New type bonus-premium reward. Write for feature samples on approval. Free samples name imprinted Christmas cards, exclusive stationery, free color illustrated catalog, selling guide. New England Art Publishers, North Abington 1933-A, Mass.

MEN, Women, make money spare time plus new car as bonus for encouragement. Amazing hosiery guaranteed to wear without holes, snags, and runs, or replaced free. For example, lovely 60 gauge nylons guaranteed for as long as 1 1/4 years, or replaced free. Write Wilknit, 17310 Wash., Greenfield, Ohio.

BALL Pens \$10 gross, d.e. s.e. blades \$4.20 M. novelty flashlights with batteries \$2.25 dozen, assorted ruffled plastic aprons \$1.40 dozen up. Yo-Yo tops \$12 gross. Lutzker, 371AJ East 170th, New York City 59.

EASY Handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

QUALITY Ties—Your profit, 140%. Catalog free. Loren Specialties, 4351-A Flournoy, Chicago 24, Illinois.

BIGGEST Profits. New all-purpose silver plating polish. Cloth rub-on. NuSilver, 308-PM10, Aurora, Illinois.

300% PROFIT. Millions prospects. Take orders for plastic sealing of cards, photos, papers. Sample, details free. Plastic Seal Company, Dept. M1, 45-03 30th Ave., Long Island City 3, N. Y.

EXPERIENCED Distributors, agents. 150% new vitamin supplement. Write Pas-Cal Vitamin-Mineral Products, Box 203-P, Altadena, Calif.

MEXICAN Feather pictures. Sell on sight: 200% profit! Free details. Sample 20c stamps. (No coins.) Sylvia P., Apartado 9030, Mexico City.

AGENTS Wanted: Sell household appliances. Send for wholesale catalog. Rueblings, Sicklerville-P, N. J.

PROFIT Packed Christmas sales. Famous brand French perfume, eau de cologne. Combination perfume-manicure cutlery gift sets, wildfire sellers. Lowest factory prices. Giant profit and bonus plan. Free testers with sample order. Write for free catalog. Lido Products, 126 Bleecker St., Dept. P-1, New York.

MEXICAN Feather pictures. High profit! Fast sellers! Adelphi, Box 57-B, Bellrose 26, N. Y.

A Dress-lingerie shop in your home. No investment. Good commissions. Write for sample book. Modern Manner, 260PA Fifth Avenue, New York.

BIG Money selling Walker's famous tooth powder. James Walker, Jr., 663 S. Plymouth Court, Dept. 11, Chicago 5, Ill.

PAY Way! Wood-chain saw. Rotohoe. Also, TV unit. Earn yours! Farmco-51, Excelsior Springs, Mo.

MAKE Money introducing world's cutest children's dresses. Big selection adorable styles. Low prices. Complete display free. Rush name, Harford, Dept. K4341, Cincinnati 25, Ohio.

AT Last! Something new and sensational in Christmas cards. Make extra money fast! Show satins, velours, metallics. Gets easy orders. Pays up to 100% cash profit. 30 free samples. With name \$5 for \$1.50. Big line. Amazing new Glitter-in-the-Dark ornaments, personalized matches, stationery. Several \$1.00 boxes on approval. Pure Greetings, 2801 Locust, Dept. 340-M, St. Louis, Mo.

AGENTS—Show America's leading nationally advertised line—Novelties, gifts, utility items, 100% profits. Prospects everywhere. Steady repeats. Write today for sensational low prices, free literature. Charms & Cain, 407-PM-103 South Dearborn, Chicago, Ill.

BIG Profits selling ties. \$2.00 values, \$6.50 dozen. Free catalog. Empire Cravats, 611A Broadway, New York 12.

SELL Quix Timesavers. Self-addressing labels. Steady repeat income. Proven product. Good Xmas gift. 300 in plastic gift box \$1. (100 gold, 100 blue, 100 white.) 500 all white in Mason box \$1. Keep 40c, send us 60c. Satisfaction guaranteed. Start in business today! Ask for special agent offer with color display card and 50 order blanks free. Start to make money same day for yourself or organization. Write Loomis & Co., 201-W Devonshire St., Boston 10, Mass.

SENSATIONAL New plan! Large wholesaler of appliances, cameras, watches, etc. will start you in new type of business. No selling. Free details. Cam Company, 6806PM-20th Ave., Brooklyn 4, N. Y.

A Postcard can put you in a fine business! Complete line. Leather jackets, 151 shoe styles. Big commissions. No experience, no investment. Send postcard for free outfit. Consolidated Shoe, Dept. CC32, Chippewa Falls, Wis.

\$10 TO \$50 Daily selling magic Carbonex. Free details. Sycamore, Box 13-PM, Oak Park, Illinois.

TERRIFIC Profit maker. Sensational costume jewelry promotion! 144 pieces, all new, all different! Pins, earrings, bracelets, necks—Enamel stones, rhinestone, tailored. Only \$42.00 gross. Special factory prices! Also religious goods. Free price lists. Customcraft Jewelry Mfg. Co., 26 Customhouse Street, Providence, R. I.

AMAZING Profits selling exclusive Sunshine Christmas cards; Nature prints, scripture text, imprints, nationally famous. 21 for \$1.00 assortments all sell on sight! Many others! Also gift wraps, stationery, etc. Send for samples on approval. Sunshine Art Studios, Inc., Dept. PM-10, Springfield 1, Mass.; Pasadena 3, California. (Note: East of Rockies address Springfield office.)

BUY Wholesale from nationally advertised manufacturers, distributors. Literature free. Carter Publications, Box 6011-H, Chicago 30.

100% PROFIT With new Red-E cover guard! Keeps garbage lids secure against weather and animals. 10-second demonstration sells on sight! Prospects everywhere. Dollar brings sample: \$6 brings dozen. Red-E Supply Co., 1240 Rose Lane, Wantagh, New York.

AGENTS! Demonstrators! Distributors! Direct from manufacturer \$25 luxury gift set, sells on sight. All gold plated bankers style ball pen, mechanical pencil, tie clip and smart cuff links. All gold plated. Beautiful jewelry box. Sample \$5, guaranteed satisfaction. Union Pencil Company, 389 Broadway, New York City.

DOUBLE Your money in spare time. Fast selling automatic downspout extension brings 100% profit. Easy 2-minute demonstration. Every house a prospect. Householders won't let you take it off after demonstration. Just clamp "Rain-A-Way" to downspout, show how it lowers automatically during a rain, folds up when rain stops. No moving around a Rain-A-Way, eliminates falls, drains water away from house foundations. Trouble-free action, heavy gauge aluminum won't rust. Fully patented. Don't wait—Be the Rain-A-Way salesman in your own exclusive territory. Full or part-time. Write today for free literature. Crawford Co., 1524 4th Ave., Rock Island, Ill.

MEN—Women; 100% profit taking orders for Sweet Georgia Brown beauty products. Tremendous demand by colored clientele. Sample offer. Valmor, 2451-MK Michigan, Chicago 16.

FREE Nylons! Men and women wanted to introduce amazing nylon stockings (guaranteed against runs and snags) by giving away free trial pair to every woman regardless whether or not final purchase is made! Earn up to \$3 an hour spare time. Advance cash plus 40% bonus. Postcard brings you free sample stocking and moneymaking outfit. Nothing to pay now or later. No obligation. Kender, Babylon 53, N. Y.

BUY Wholesale and save 50% on big name merchandise. Xmas gifts. Make big profits selling your friends or for your own use. Our 1953 catalog is ready. Rake, 667-PM Spring Garden, Philadelphia 23, Penna.

101 WAYS To make \$1,000 at home. Details free. Business Surveys, 365 S. Fairfax, Los Angeles 49, Calif.

SCHOOL Seniors—Have fun and spending money! Be popular with your classmates. Send postal for details. Craftcards, Box 235-L, Pittsburgh 19, Penna.

STRIKE It rich with flannel backs. Scientific tablecover marvel not plastic, not linen, better than either. Outlasts 18 years scrubbing. Show free samples. Take orders. Pocket Juicy profits. Styleco, Dept. 399, Cincinnati 10, Ohio.

BUY Wholesale. 25,000 items. Catalogue 25c. Matthews, 1472-B1 Broadway, New York City 36.

AMAZING New mop. Whirlwind seller. Wonderful profits. Generous sample offer. See Artmoore ad, page 50.

\$200 WEEKLY. New invention. Amazing 4-second Presto emergency tire chains, fit all modern auto wheels. National advertising building big demand. 3 sales daily to oil stations, dealers, etc., make \$200 or more weekly. Territory going fast. Write Presto Chain Co., Dept. P-24, Des Moines 2, Iowa.

WHOLESALE Catalog. Nationally advertised appliances, watches, etc. Send today for free catalog. Carroll Distributors, 4421 Snyder Ave., Brooklyn 3, N. Y.

PRINTING, Salesbooks, envelopes. Free illustrated catalog. Ersco, Dept. PM, Bronx 72, N. Y.

GOLD. Silver lacquered letters. Windows, doors, trucks. Standard sizes. Penny and up. Big profits. Samples. Atlas-D, 544 West 19th, Chicago 20.

MAKE Extra money. Sell front door name plates to friends, neighbors. Retail \$1.98; you make \$1.00! Free selling kit. Modern Engraving Co., P.O. Box 194, Boston 14, Mass.

ABSOLUTELY Free—Sales kit. Yours for the asking. Send postcard today requesting kit showing new line, belt buckles with your name or personal initials, cap badges, choice 3000 different emblems. Write Hook-Fast, Box 1425PM, Providence, R. I.

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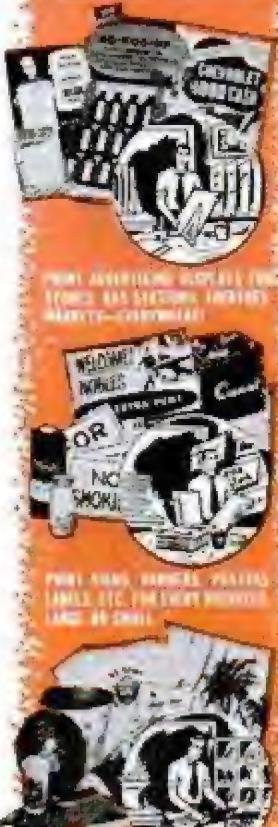
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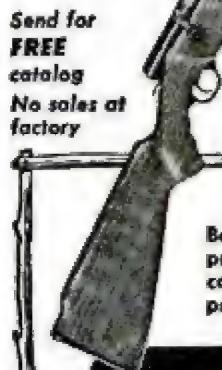
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.22 RIFLE BARGAIN CARBINE STYLE

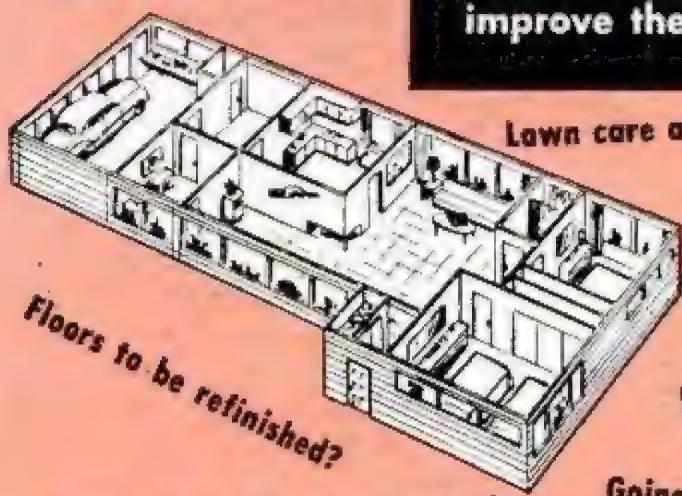
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4 lbs.. 3 oz.



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Plan any painting?



Floors to be refinished?

Need a better hot water heater?

FREE Popular Mechanics service for readers
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improve their homes.

Lawn care a problem?

Planning to build a new house?

Intend to add a new room to your house?

New garage doors needed?

New heating system necessary?

Going to redecorate?

Going to remodel your home?

The interesting catalogs offered FREE by the building material, home equipment, and building supply advertisers in this issue can give you a better picture of the best available today.

All such advertisers in this issue are listed on this and the following page. Each listing gives the page number of an ad.

Study the advertisements. Then, if you wish certain

catalogs,—either write directly to the advertisers—or, save bother, time and postage by using this FREE Popular Mechanics service: mail your request for catalogs, directly to us. We'll get them for you. A coupon for your convenience appears at the bottom of the following page. On it, circle the numbers of the desired catalogs. P-R-I-N-T your name and address, and mail coupon to:

Here is the classified list of the home products and services advertised in this issue. Read listings—to see advertisements themselves, turn to pages indicated by numbers following each listing.

Popular Mechanics

Reader Service, Room 305
200 East Ontario Street
Chicago 11, Illinois

AWNINGS

1. Herbert's Aluminum Awning..... 326

BUILDING MATERIALS

2. Armstrong Cork Co., building materials..... 2
3. Bruce Co., E. L., hardwood floors..... 256
4. Marsh Wall Products, Inc., Marlite prefinished wallpanels 347
5. Masonite Corp., Preswood products..... 272
6. United States Plywood Corp., plywood..... 266

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8. Coleman Co., The, Blend-Air..... 287

9. Midget Louver Co., The, ventilating units..... 312

10. Paragon Electric Co., automatic heat control..... 88

11. Timken-Detroit Axle Co., The, automatic heating..... 267

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HOUSEHOLD SUPPLIES

14. Ambroid Co., Inc., liquid cement..... 320
15. Boyle-Midway Inc., 3-In-One oil..... 286

List continued on next page

**FREE Popular Mechanics service
for readers of this issue who
plan to build, remodel, and im-
prove their homes**

continued from preceding page: Classified list of home products and services advertised in this issue. Numbers following each listing refer to magazine page numbers.

INSULATING MATERIALS

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| 21. Gravely Tractors, Inc., tractors..... | 334 |
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| 40. Molly Corp., screw anchors..... | 323 |
| 41. Werner Co., R. D., Alumiladders..... | 274 |
| 42. Steel Protection & Chemical Co., Plastex waterproofing | 341 |

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The numbers below correspond to the numbers of the lines in the listings above, and on the preceding page. If you want information on any subject listed, simply circle corresponding number below, then fill out card and mail to: Popular Mechanics, Reader Service, Room 305, 200 East Ontario Street, Chicago 11, Illinois.

1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18
19	20	21	22	23	24	25	26	27
28	29	30	31	32	33	34	35	36
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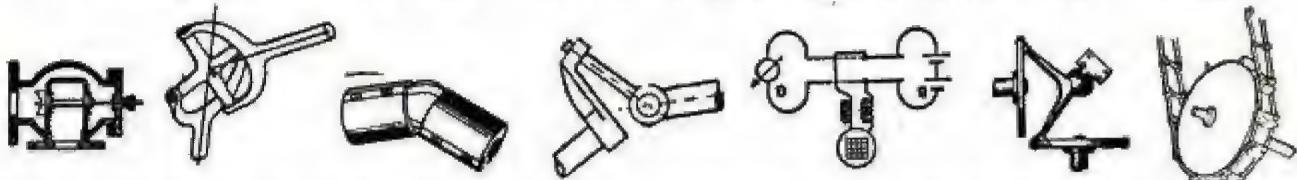
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Send only \$3.95 (or C.O.D. plus postage). It's really a remarkable value and sold on a money back guarantee.

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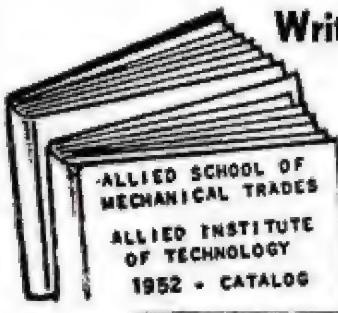
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always
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OCTOBER
1953

WRITTEN SO YOU CAN UNDERSTAND IT
VOL. 100 NO. 4

ON PATROL WITH A KILLER SUB

U. S. Navy photo

By Thomas E. Stimson, Jr.

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The only warning an enemy would receive would be a sudden beelike buzz as one of our torpedoes raced toward him, followed by an instant of terrible commotion and then oblivion.

That's what would happen if we heard the intruder first. But if we were noisy it might be the enemy who delivered the first, lethal punch.

To rehearse this eerie kind of warfare we lay quietly in the depths of the Pacific with our ultrasensitive listening mechanisms probing the water in all directions.

During the war our undersea forces sank more than a score of enemy submarines that were traveling on the surface. Those experiences led to the concept of real underwater warfare, a grim blind battle between submerged fighting ships. Our new K-class submarines are designed to kill enemy subs that otherwise could wipe out our around-the-world shipping.

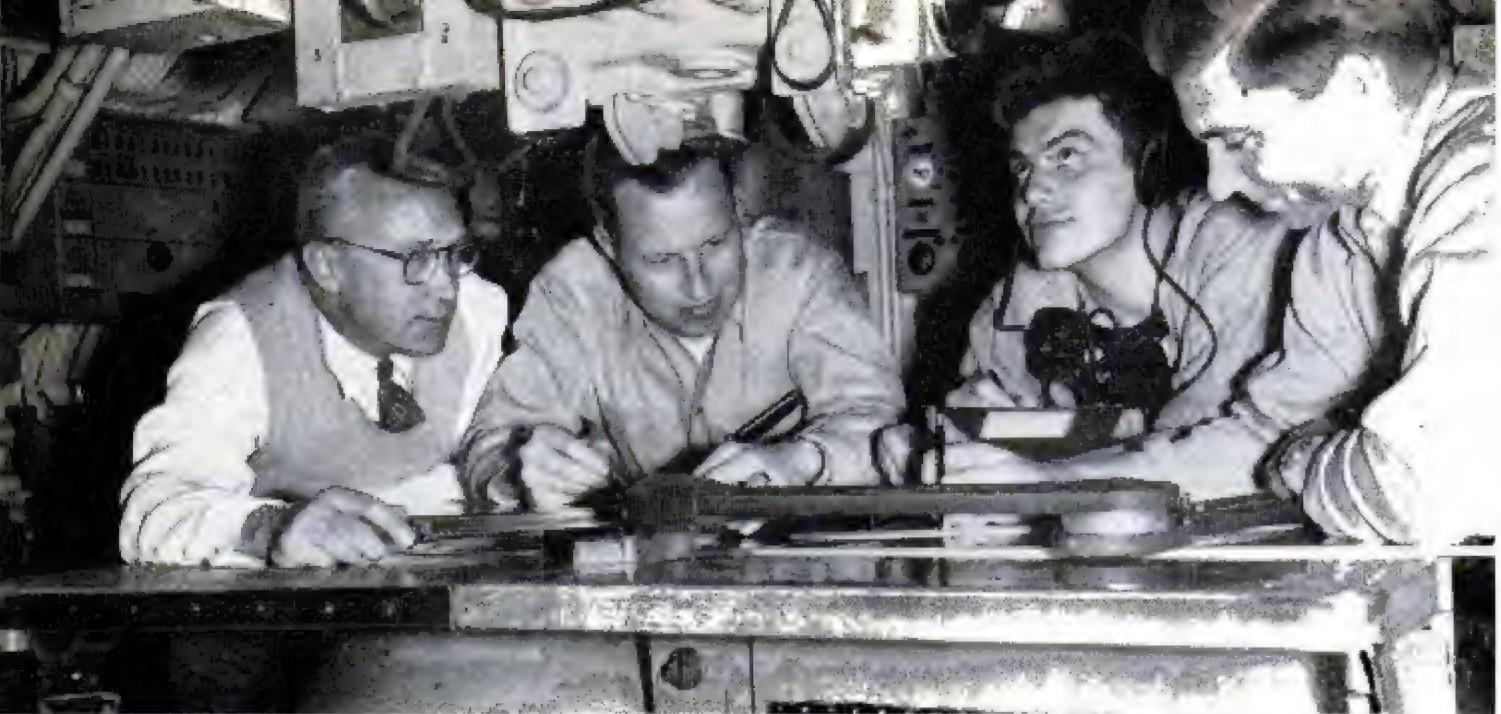
Before we had dived to listening depth on our practice cruise,

Lt. Comdr. R. G. Johns, Jr., captain of the Segundo, explained the job of the killer to me.

"It's an ultimate in mechanized warfare," he declared soberly, "for you never are personally aware that an enemy is within reach. We can't see a submerged target. We fight with dials and gauges, automatic calculating machines and push buttons.

Under guidance of sub's skipper, the author takes over the sonar panel to listen to fish chirp and possibly to detect a surface vessel





Stimson watches while officers transfer sonar information on a submerged target to the plotting board

"Only by instruments is a target detected. It's tracked by other instruments and is fired upon by means of instruments. And only by instruments can we tell if we have smashed and sunk the enemy.

"We rely mostly on sound waves to detect the enemy, and the enemy has ears, too. That's why we remain quiet."

It seemed quiet enough to me, standing in the control room, when the diesels were shut off on our first dive. Men had rushed to their stations when the diving horn blared, hatches were slammed shut. The deck tilted underfoot. There was a short blast of compressed air and then the boat became silent.

But it wasn't quiet enough for its role of stalking other submarines. The captain

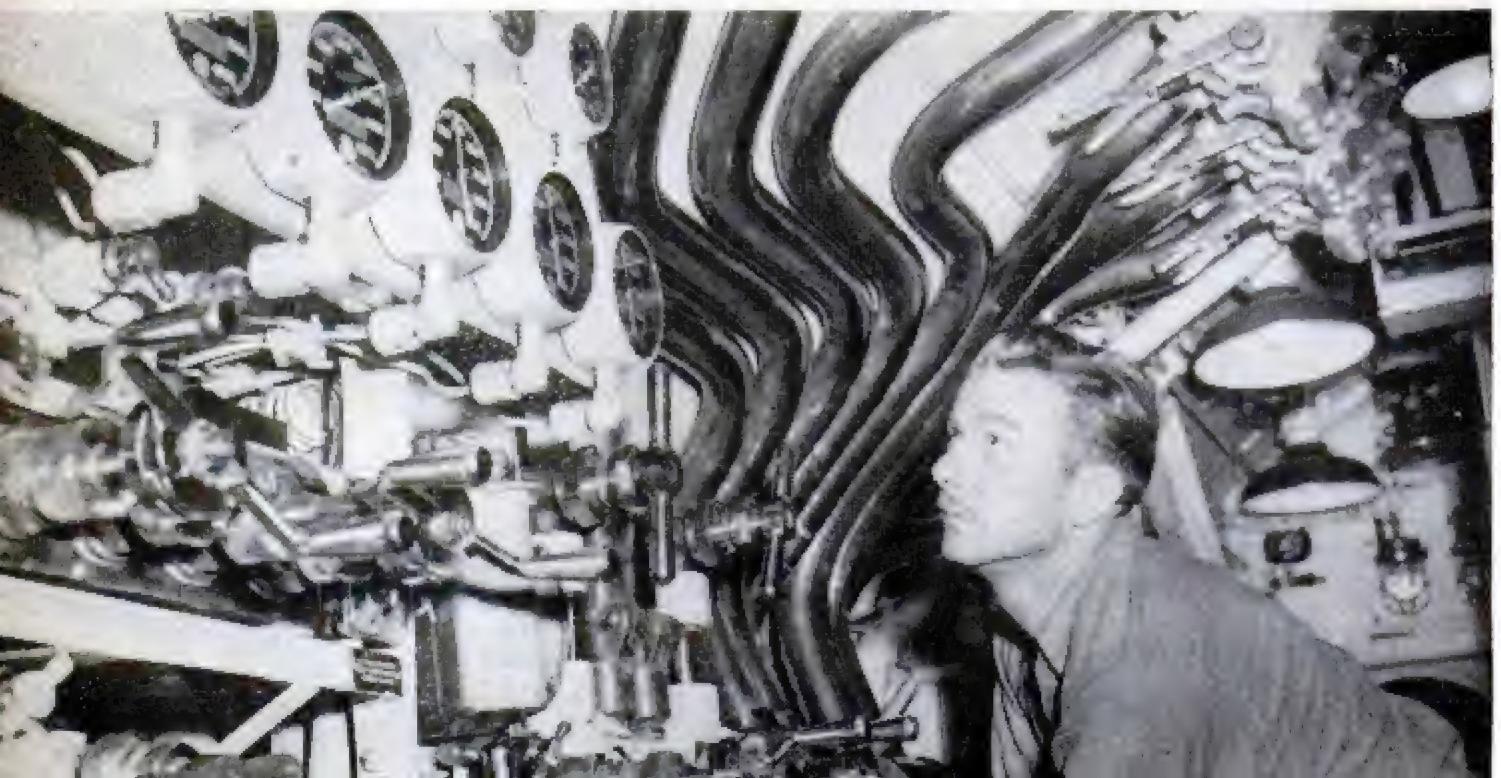
picked up his microphone as soon as the boat leveled off.

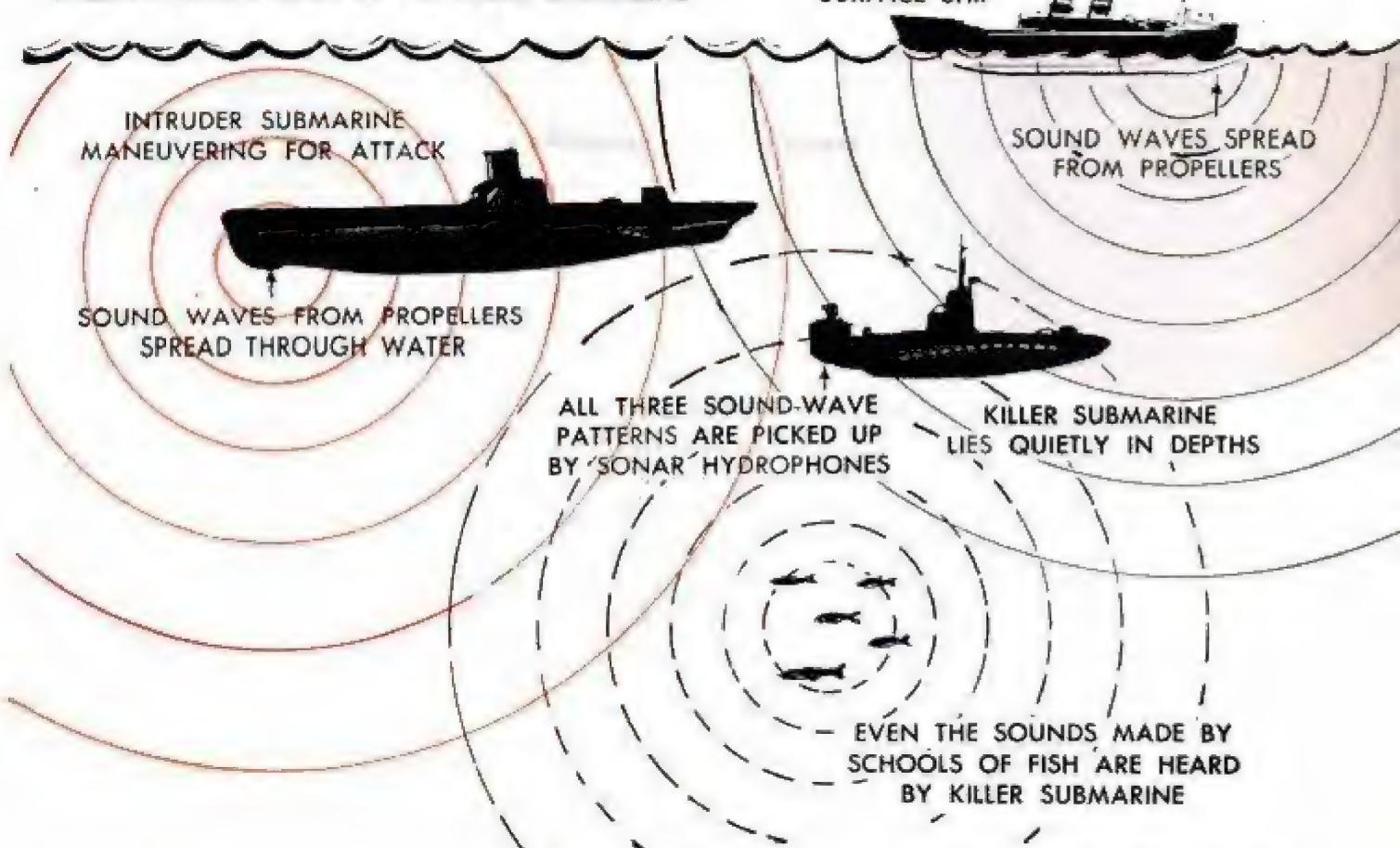
"Rig ship for ultraquiet!"

Men shut down every piece of machinery that could be spared. The air-conditioning system came to a stop and the switch was pulled on the intercom system. From now on communication would be by sound-powered phones.

In the main sound room and at other locations the sonar operators were adjusting their earphones and balancing their circuits to filter out the background noises. The rustle of water through our own superstructure, the slow turning of our propellers when we are moving and the staticlike crackle of waves all form part of the sound background.

Submarine is literally jammed with equipment. Here the air manifold operator prepares to blow ballast tanks





In the control room, a sailor pulled his phone leads from the self-noise panel, satisfied that we were emitting no sounds that would travel very far. This detector is something like a stethoscope with which you can listen to the beating of your own heart. It's attached to hydrophones on the outside of the hull and not only measures our own sound level but helps to identify any machinery that might be causing unnecessary noise.

Meanwhile, the main sonar operator has been sweeping all around the compass with his long-range listening device. His assistant passes notes to him instead of speaking.

An experienced sonar operator can identify sounds that most people would hardly notice. With training he can locate schools of fish and sometimes even identify their species by the chirps, hoots or squeaks they emit. He can locate reefs, identify various types of surface ships and hear the faint sounds of another submarine traveling submerged.

Lying dead in the water, the killer submarine is so delicately balanced that a man walking the length of the boat can change its trim. We have been sinking slowly for awhile, then the depth gauge shows that the downward motion has stopped. The chief of the watch explains that we have settled onto a layer of cold water that will support us for a long time.

It will be a long time until dark, the clock shows, and there's little to be done until

Using passive sonar, killer submarine lies silently in water, listening to every sound. The sonar operator can detect schools of fish, surface ships and an enemy sub maneuvering into position for an attack

Inside soundproof room, the sonar operator becomes ears of the sub. His "talker" in foreground relays information from conning tower, writing down messages to avoid talk that might interfere with listening





When sub surfaces, lookouts scramble up to their stations beside "sail." Snorkel subs seldom need to surface completely

then, aside from the ceaseless listening. After dark we'll go up to snorkel depth for a battery recharge. In the meantime most of the crew rests or reads. A movie in the forward torpedo room helps to pass the time. If the air becomes stale it will be freshened by releasing oxygen from a cylinder and by spreading on the decks a substance that absorbs carbon dioxide.

In actual warfare this routine could go on for three weeks or more, just on the chance of getting three minutes of action. This would begin when one of the sound men detected a suspicious noise. Within seconds he can localize its direction:

"High noise level bearing three four zero!"

It could be a surface ship in which we aren't interested; the crew is called to battle stations only if the object proves to be a submarine. A man in each compartment

quietly taps anyone who is asleep, sonar begins to feed information to "sound plot," and the computer starts grinding out the necessary firing data for the torpedoes.

There's no question in the captain's mind as to whether he will fire on the unseen intruder. No other friendly sub has been assigned to this area.

The captain's big hope is to get off a shot before the enemy suspects he is there. The first shot must count and to make sure that it will, the killer sub has a torpedo that needs to be fired only in the general direction of a target. Once on its way it steers itself directly to its goal. During training maneuvers, a torpedo of this kind, without a warhead, has smashed with a solid thump against the side of a target submarine that was trying to elude a killer.

The K subs use two kinds of sonar—active and passive. One of the sound men explained the difference.

"In passive sonar," he said, "you just listen to the sounds that our hydrophones pick up. But passive listening doesn't detect an object that creates no noise. We can track another submarine while it is moving but it just seems to vanish when its motors and propellers are stopped."

"Active sonar can still find it, however. This apparatus sends out pulses or pings of sound. We can hear any reflections that bounce back from objects. The principle is similar to radar and has the same objections. That is, the target submarine can hear our pings and become aware of us. Then each submarine stalks the other."

Rear Adm. C. B. Momsen compares this situation to a fight between two blind men in a small room, each armed with a hatchet. Both are likely to be killed.

"There are sonar countermeasures, to be sure," the sound man explained. "The Germans used sound-absorbent coatings on the hulls of submarines to prevent reflecting sonar pings. But a coating is good for only one wavelength, while we can ping at various wavelengths."

"Another countermeasure consists of noisemakers that are fired from the tubes. Noisemakers thrash around on different courses and tend to confuse anyone who is listening."

Even at its best, sound is not always reliable for pin-pointing a target, I learned. There are many reflective surfaces underwater that can bounce sound. Reflections or refractions occur at each thermocline or division between layers of water having different temperatures. Too, a layer of cold



In the maneuvering room, controller men change speeds of the powerful diesel engines by moving lever switches

water with warmer water above and below it may serve as a channel and conduct faint sounds for many miles. A sonar operator can't always be sure of the exact location of a target even if he does detect its actual presence.

A killer boat has no friends. Ships or aircraft on its own side might not pause to identify it, so a killer rarely climbs all the way to the surface. Instead, it goes up to snorkel depth and raises its breathing tube into the air. This furnishes enough air for operating one or more of the oxygen-consuming diesels that charge the batteries.

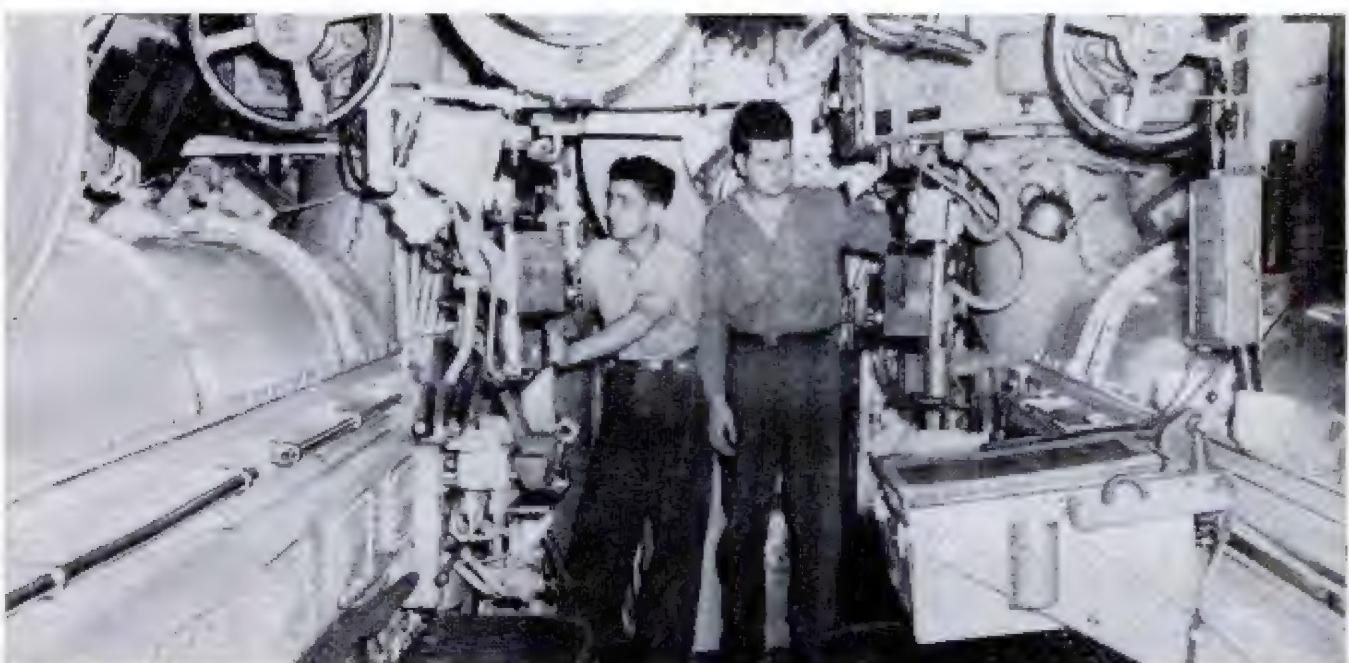
I'd been wondering why the Segundo carried an aircraft altimeter and I found

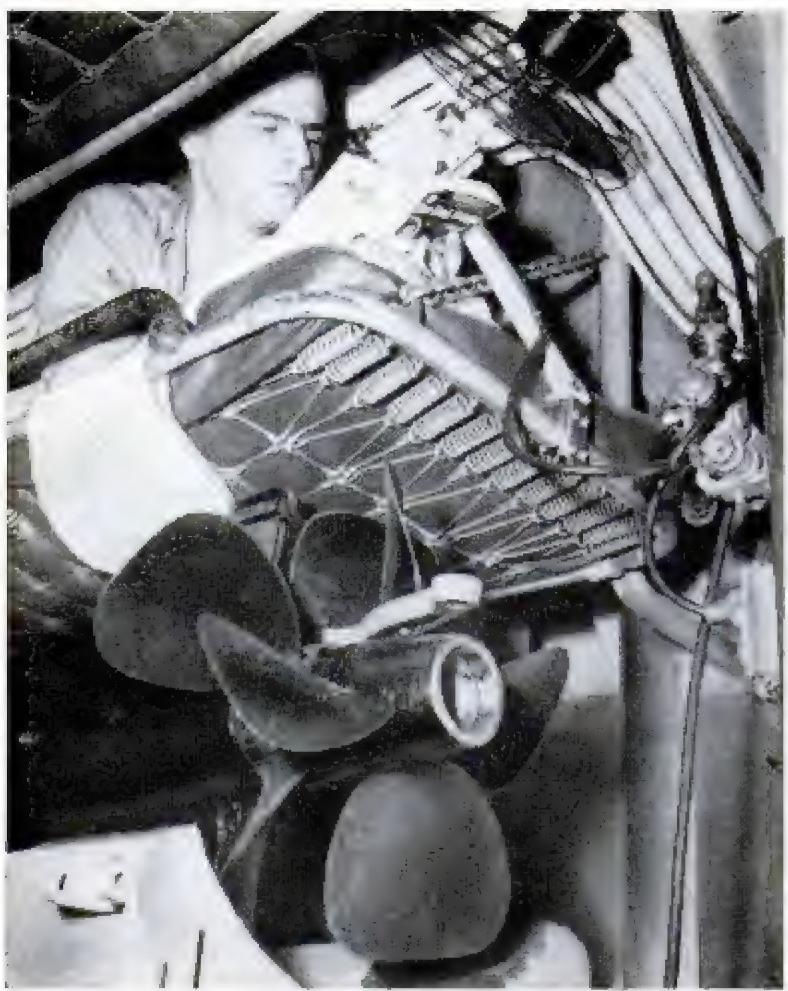
out the reason when we started up toward snorkel depth. All day we had been under an air pressure equal to 200 feet below sea level and, now that we were ascending, air was pumped from inside the hull to help blow the ballast tanks. This restored the atmospheric pressure to that of sea level.

But the pull on your eardrums suggested that the air pressure had changed again as soon as snorkeling began. A glance at the altimeter showed that we were now cruising at 2000 feet altitude, a perfectly silly reading for a submarine.

One of the engineer officers grinned when I asked him how come, and explained that the volume of air drawn down the snorkel

Throttleman and oiler check two of the four engines which propel the submarine and charge the batteries





Pleasant dreams! Quarters are so cramped that some members of crew of 80-odd men sleep beside or atop spare torpedoes. Below, operation of stern light is checked as sub leaves harbor



pipe didn't quite meet the demands of the two diesels. The engines had sucked some air from inside the boat itself. This demand was equalized when the pressure inside the hull corresponded to 2000 feet altitude.

Occasionally we'd "climb" another 500 feet when the snorkel valve automatically closed to prevent our being swamped by a wave. Then we'd return to the previous pressure when the valve opened. A snorkeling submarine can change air pressure more rapidly than a fighter plane.

If we'd lost depth control and had submerged for a longer period the engines would continue to consume the air inside the hull until the pressure dropped to the equivalent of 5800 feet altitude. Then a pressure switch would automatically shut off the diesels.

Actually the *Segundo* is not one of the new K-class boats that have been built especially for killer duties. The *Segundo* is a wartime sub that sank its share of Japanese ships and that has been modernized with new sonar gear and a snorkel pipe. Its crew, nevertheless, is being trained in killer tactics because any of our up-to-date attack-type submarines can play the role of a killer if necessary. Also, men of the submarine fleet must be trained in the special killer tactics so they can be transferred without difficulty to any of the new K-class submarines.

The new special killers are about half the size of the large attack submarines. The killers are 195 feet long, displace about 750 tons, and have a crew of five officers and about 42 men. They can be recognized on the surface by the special streamlined "house" above the bow that is packed with the latest long-range-sound gear.

The wartime job of any of the killer subs is to lie in wait below the surface in areas where hostile submarines might be expected to attack our own surface ships. Once on station a killer lashes out automatically against any other submarine that approaches.

It is possible that killer submarines of the future may have nuclear power plants which would enable them to stay on patrol and submerged for long periods of time.

★ ★ ★



Rolling platform was devised to install fixtures overhead where the plant was without roof or floor

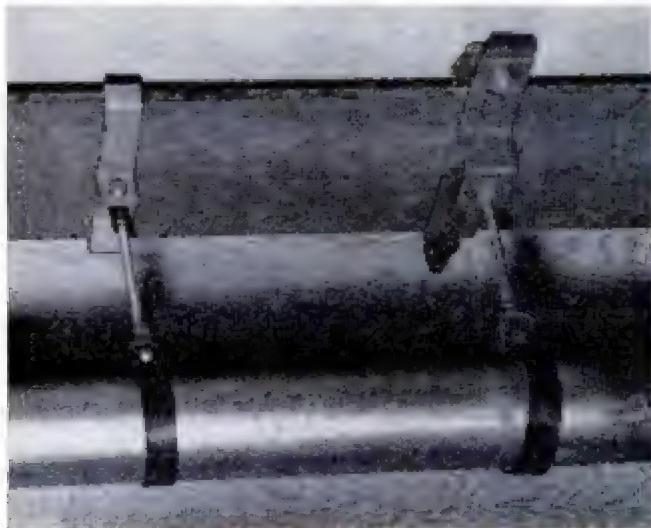


Ceiling work was done from an ingenious "trolley scaffold" in sections that had a roof but no floor

On-the-Job Inventions Save U. S. Half-Million Dollars

THREE INVENTIONS developed by a contractor have saved the government more than \$500,000 in speeding construction of the Navy's new jet-engine plant in Detroit. Thousands of ceiling-light brackets, 15 miles of conduit and 40,000 hanging rods had to be installed quickly in a building only partially roofed and floored. To speed work in sections without roof or floor, C. Allen Harlan, president of the electrical contracting company, took the wheels from his son's soapbox-derby racer and fashioned a rolling platform with guides to keep it moving safely along upper rails of the steel girders with two workmen aboard. For work in the unfloored sections, a trolley scaffold was made of strong alu-

Time was saved by using a simple new strap, below, for hanging electrical conduit. Right, electric lift hoisted long, heavy pieces of conduit into place



minum alloy. It moved along the lower rails of steel girders on three sets of wheels. When crossing beams, the man in the trolley unlocked a safety catch attached to the wheels and propelled himself past the junction. An electrically operated lift was rigged on a regular aluminum scaffolding to facilitate the raising of long, heavy pieces of conduit. A fourth timesaver was the use of a simplified hanger for conduit.



FARM-BUILT SKI TOW

By William Gilman

Below, rustic bridge supported by steel cable spans a little river to lead skiers into the miniature winter playground. In the homemade cabin, Greene sells refreshments and waxes to boost his farm income



WHEN WINTER SETTLES across Vermont and Albert Greene can no longer raise crops on his hillside farm near Middletown—he starts raising skiers. Greene operates a home-built ski tow to supplement his regular farm income.

His first step in building the tow was to move an old chicken brooder house to the bottom of a steep pasture. Comes December, he drives his crawler tractor into the old building. The tractor serves as power plant for the tow and the pasture doubles as the ski slope.

The captive tractor operates an 1100-foot rope tow that whisks winter sports fans to the top of the hill in 1½ minutes. Greene uses one-inch rope for the ski tow, which runs off a pulley turned by the tractor's power take-off belt. The rope passes first through an idler pulley, adapted from an old automobile wheel. A similar idler is anchored to a tree at the top of the hill.

Near by, Greene built a rustic bridge and a hut where skiers can buy refreshments and ski waxes, and can warm up between runs down the steep slope. It adds up to a neat winter playground—and a profit for the farmer.

★ ★ ★



Enterprising farmer oils idler pulley while two skiers await a fast trip to the top of the ski slope.
↓Operating captive tractor, Greene watches through window of old chicken house as skier traffic moves uphill



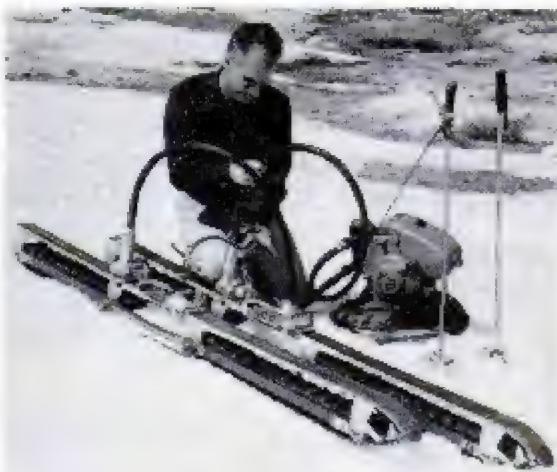
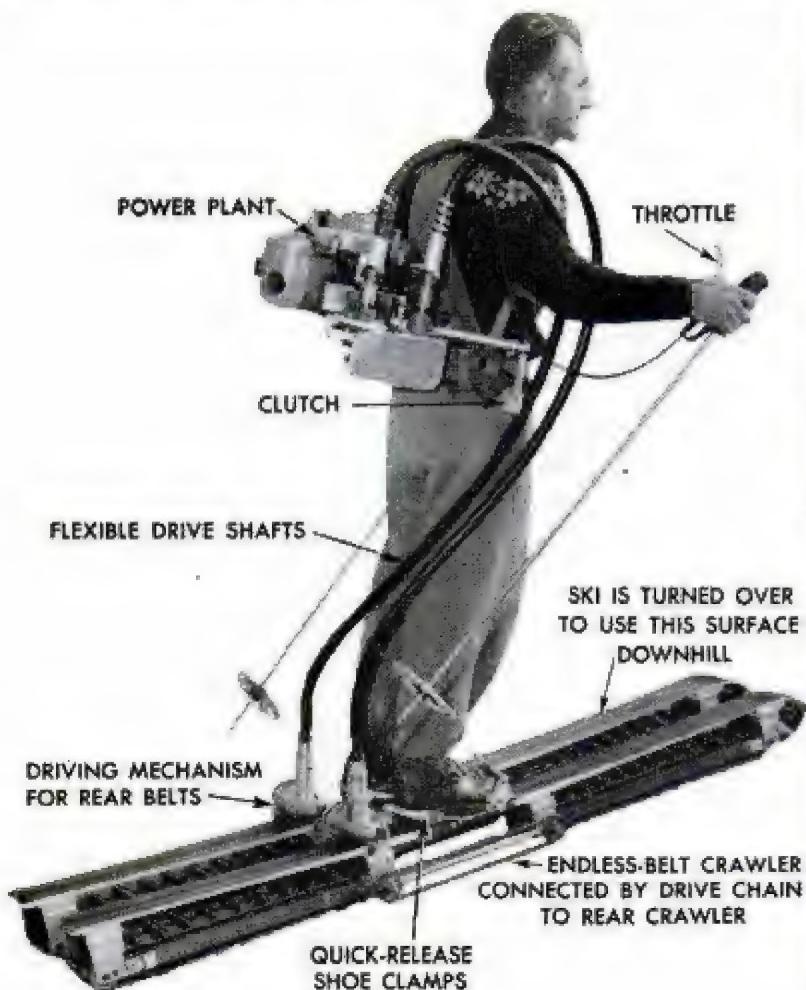
CATERPILLAR SKIS

STAN VOORHEES of West Los Angeles doesn't hitch a ride on a ski lift when he goes out for winter sports. His motorized skis propel him uphill faster than a man can walk. Fitted with crawler-type cleats and powered by a 3½-horsepower outboard-type gas engine that straps to his back, his skis carry him up a 20-degree slope at 4 miles per hour. At the top of the slope, Voorhees detaches the drive mechanisms and turns the skis over, then coasts downhill. Traversing and other maneuvers are easy. The endless belts are attached to standard seven-foot Army skis. At present, each ski weighs 30 pounds but, with redesigning, Voorhees expects to reduce the weight. Ultimately, a small motor in each ski may replace the present power plant now carried on his back.



Moving uphill at four miles per hour, users of powered skis find snow humps and other obstacles no problem. Below, power-plant pack weighs 47 pounds

Attaching power-plant shafts, below, to tractor drives on skis. Bottom, with the shafts removed and the skis turned over, the skier is ready for downhill travel



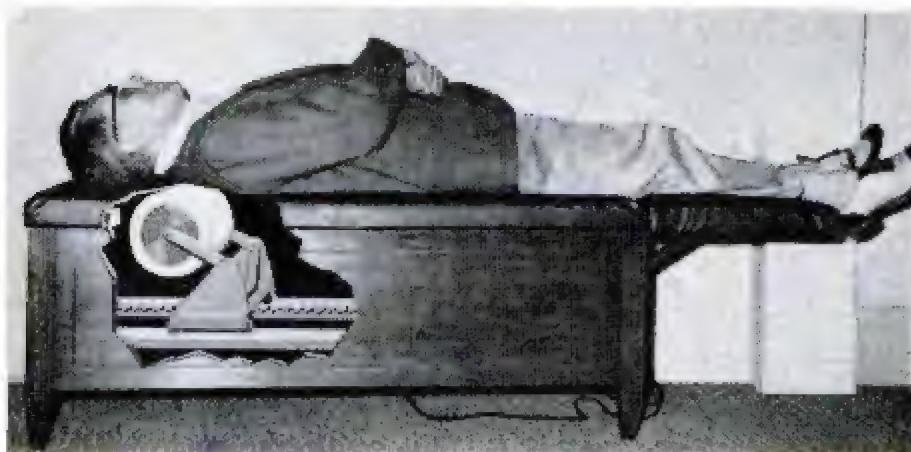


Fast British Research Plane Has Movable Tail

Short, stubby swept-back wings and a movable, delta-shape tail distinguish the SB-5, new British research plane. The little

plane was built to study the problems of swept-back wing models. It's one of the fastest jets aloft.

Motor-Driven Massage Table Helps Busy Executives Relax at Office

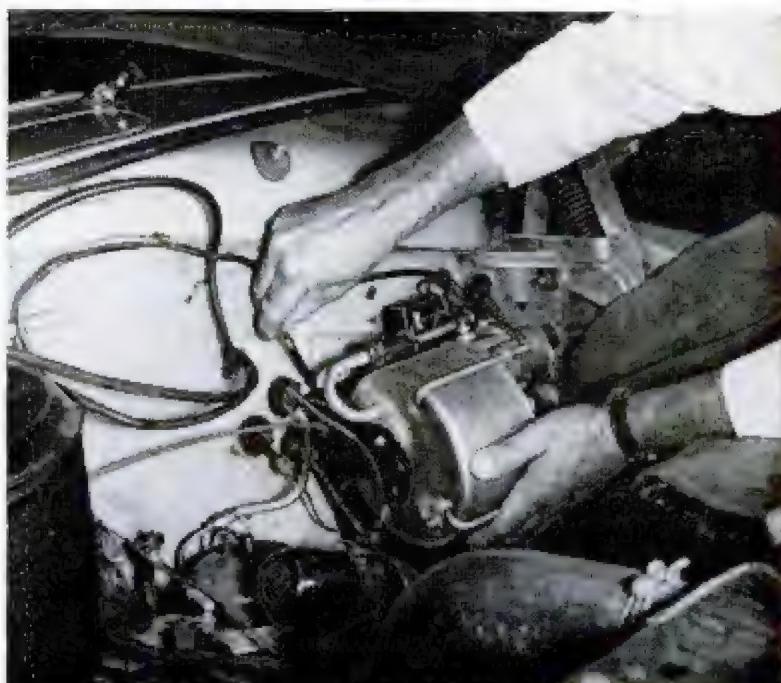


Spinal massage to reduce muscle and nerve tension is provided by a mechanical relaxing bench, designed for busy executives who are under constant strain during their working hours. A motor-driven sponge-rubber cylinder moves back and forth along a nine-inch-wide slot in the bench top, gently massaging the spine.

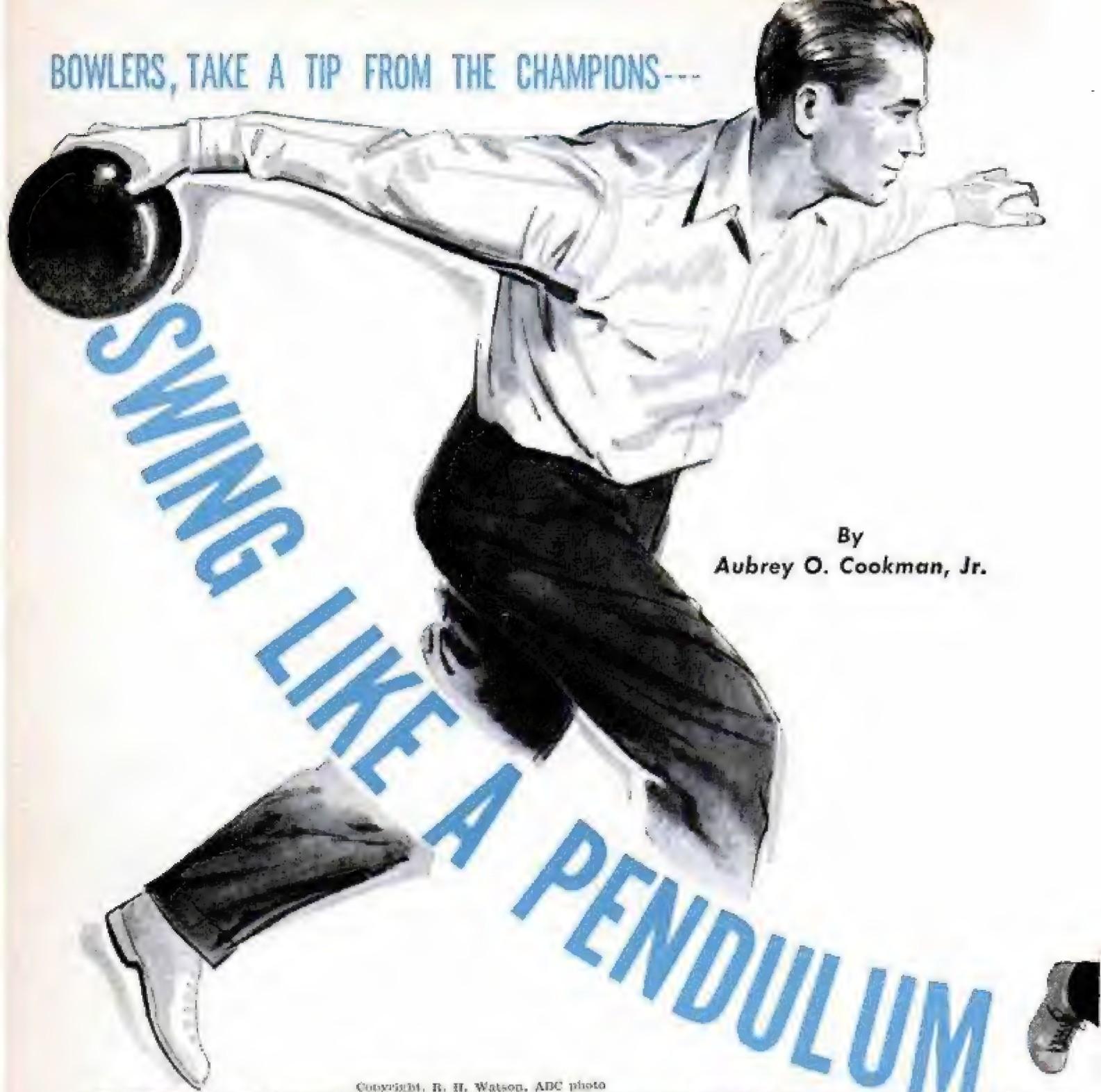
Power-Brake Attachment For Older Cars

Power brakes now can be applied to cars as much as seven years old. A power-brake unit, manufactured by Bendix Aviation Corporation, can be installed on virtually any make of passenger car by a competent mechanic. The unit adds power braking to regular hydraulic brakes. It is complete with all fittings necessary for installation in engine compartment.

Information not listed on articles in the index frequently is listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge from Bureau of Information, Popular Mechanics, 200 East Ontario Street, Chicago 11

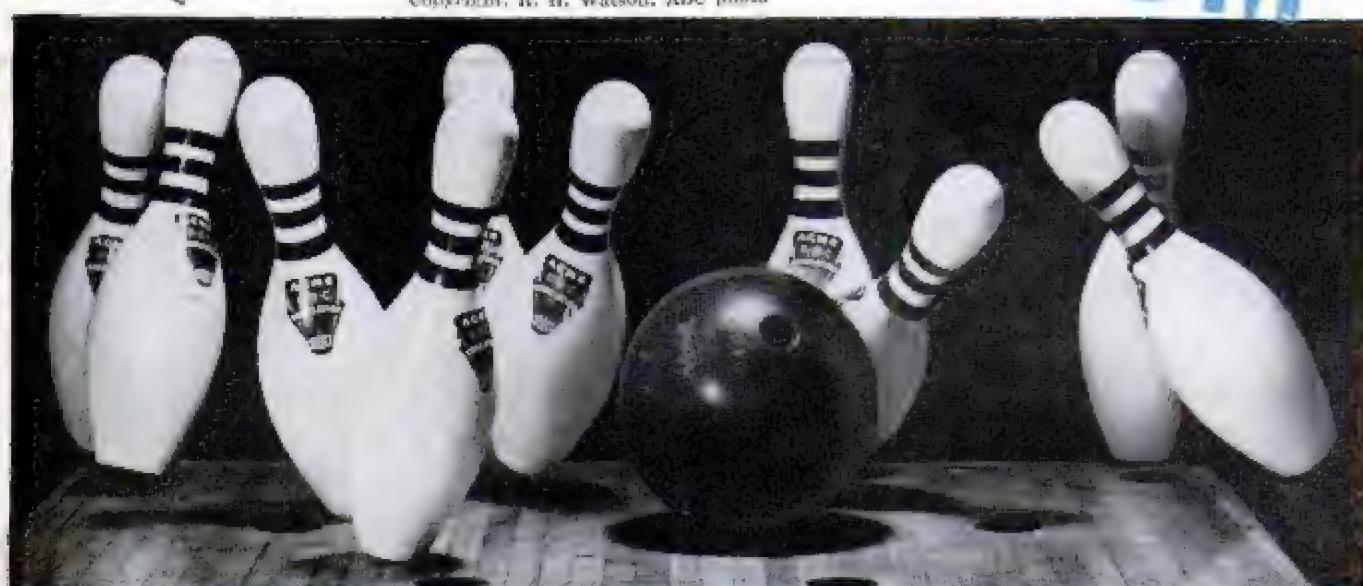


BOWLERS, TAKE A TIP FROM THE CHAMPIONS---



By
Aubrey O. Cookman, Jr.

Copyright, R. H. Watson, ADC photo



REMEMBER THE RHYTHMIC, measured swing of the pendulum on the old grandfather clock? Too bad those towering timepieces are a rarity now, because seeing that motion regularly would be a helpful influence on some 20 million enthusiasts bowling regularly in the United States.

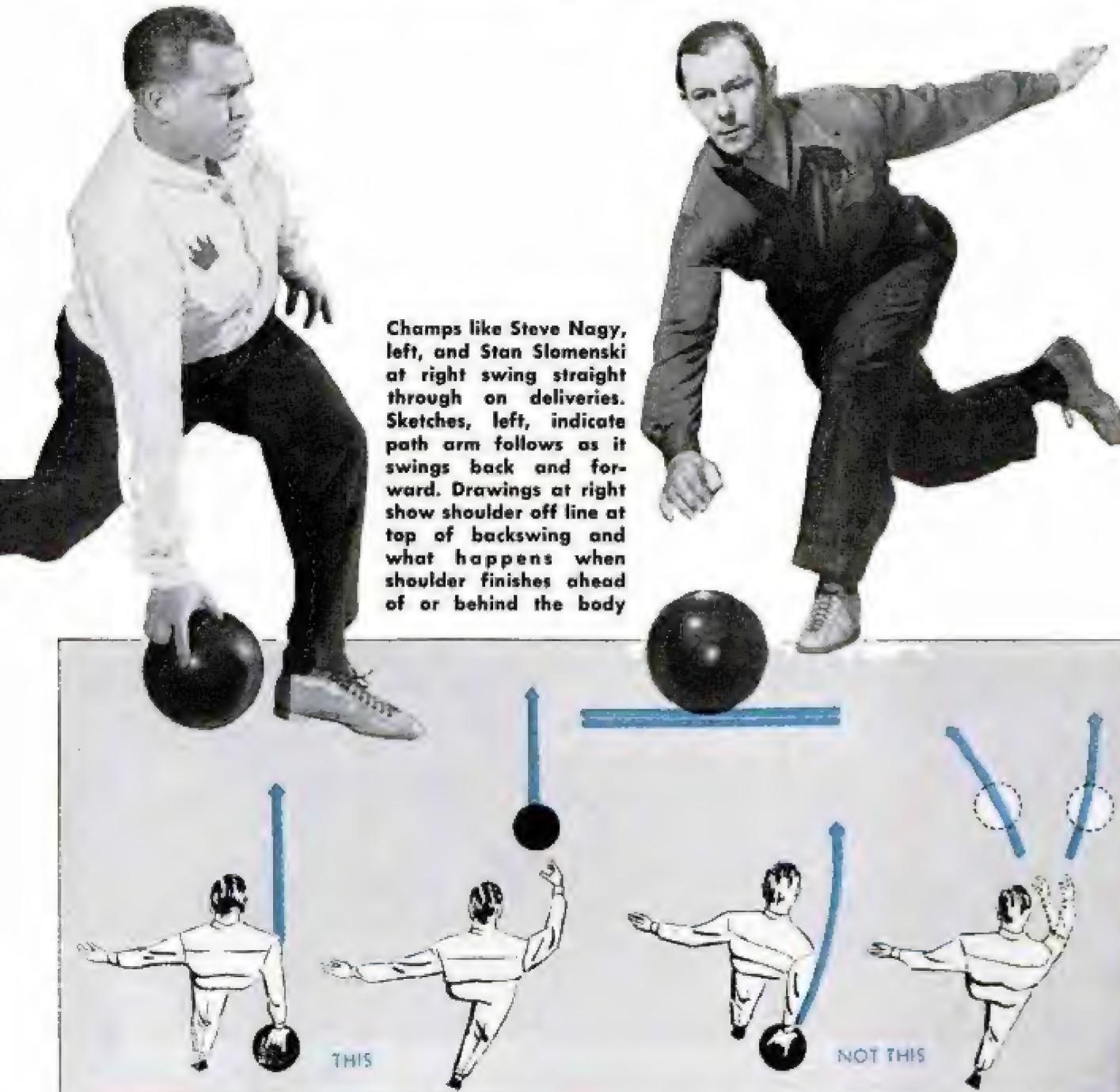
Swing your arm like a pendulum, the experts say, and you've cleared the toughest single hurdle on the way to developing a sound tenpin game. Failure to do it accounts for about 75 percent of bowling's "wild pitches."

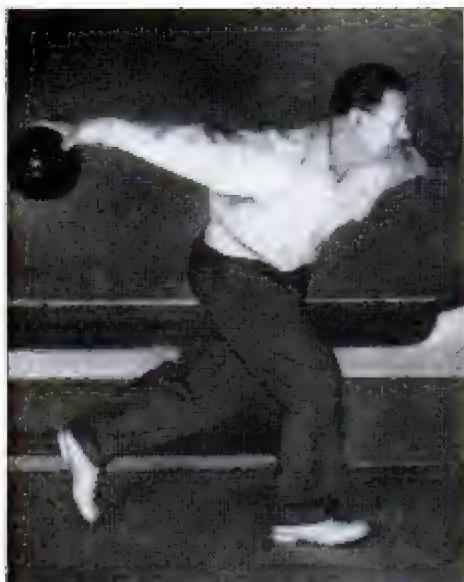
Swing your arm on a straight line, all the way back and all the way forward, until the ball has left your hand. Sounds simple, doesn't it? Yet, most teaching professionals, though they differ on other how-to-do-it aspects of the game, agree that the pendulum swing is a fundamental. Mastery of it can spell the difference between a me-

diocre, erratic bowler and one in the 175-plus average class.

Remember last season, when your ball scooted wildly to the left of the strike slot? Nine out of 10 times that happened because your shoulder shifted forward near the end of your delivery, finishing ahead of your body. In contrast, those off-center pitches to the right side probably came when shoulder lagged behind body.

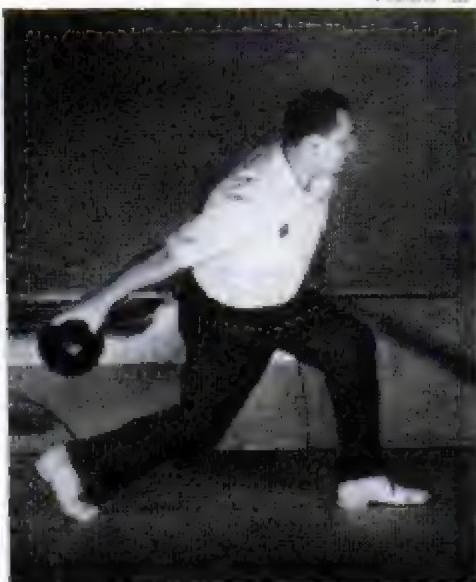
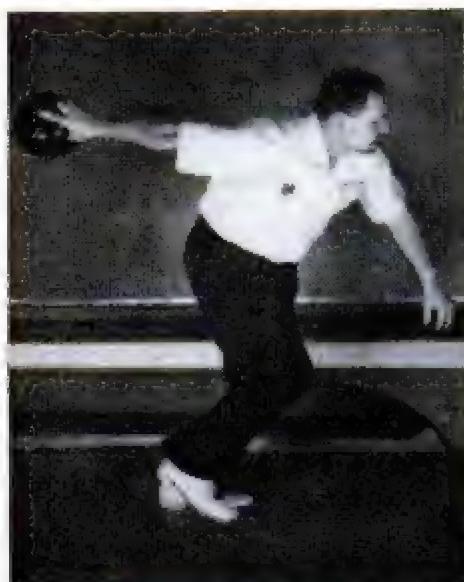
Those mistakes are often compounded or aggravated at the top of the backswing, where many bowlers crook their throwing arm behind them. Some flip the arm outward at this stage, many inches out of the pendulum groove. Once his arm is out of the groove, it is a rare kegler who can recover fast enough to straighten out his delivery during the fraction of a second of the downswing. It usually continues along the same swerving path.





Here is Stan Slomenski, a former national champion, at the height of his backswing, just as the second step is completed. In the middle panel he has reached the halfway mark of his delivery, with his right foot swung behind his body for balance during the slide. Right, he has released the ball and his hand follows swing through

Photos on this page courtesy of Bowling Magazine



In contrast to Slomenski's three-step approach, Steve Nagy, another topnotcher, takes five steps. His backswing, left, is at its height between the third and fourth steps. Nagy's body is lowered, center, as he starts his final sliding step. Right, Steve's thumb is out of the ball and his fingers are giving it a final lifting motion

Bill Lillard's forte is a good hook ball. Left, a straight wrist enables him to stay under the ball with his fingers as it swings down during his fifth and final step. In the center panel his arm is swinging past the left foot, which is sliding. Note cupping motion of his hand, right, as he follows through after releasing the ball



You'll be surprised at the many bowlers whose effectiveness is mainly limited by a faulty arm swing. Sit behind some at your local alleys and watch the wobbly paths their arms follow back and forward. In your own case, a full-length mirror will be helpful in smoothing out the wrinkles as you try for a pendulum swing.

Dick Watson, a Hollywood film projectionist, has devised another way of seeing yourself in action and makes it available each year at the American Bowling Congress tournament. Watson, who is also a star bowler, groups a battery of speed lights around a stub alley, consisting only of the approach space and a few feet beyond the foul line, and has a photocell tripper that takes a photograph of the bowler at the instant the ball leaves his hand.

When the pendulum swing is mastered you are ready to arm yourself with the second ingredient needed for an expert game—a hook. Rarely does a bowler move into the championship class, or even get to be a topnotcher, without an effective hook. That's one sports axiom that has stood the test of time.

The hook and its variations are balls that swerve, curve or turn into the "pocket" between the 1-3 pins, for right-handers, or the 1-2 for left-handers. Nine out of 10 times, properly thrown, a hook will topple all 10 pins for a strike. If you're a sports novice, the strike in bowling is comparable to a home run in baseball, a touchdown in football or a 250-yard drive down the middle in golf.

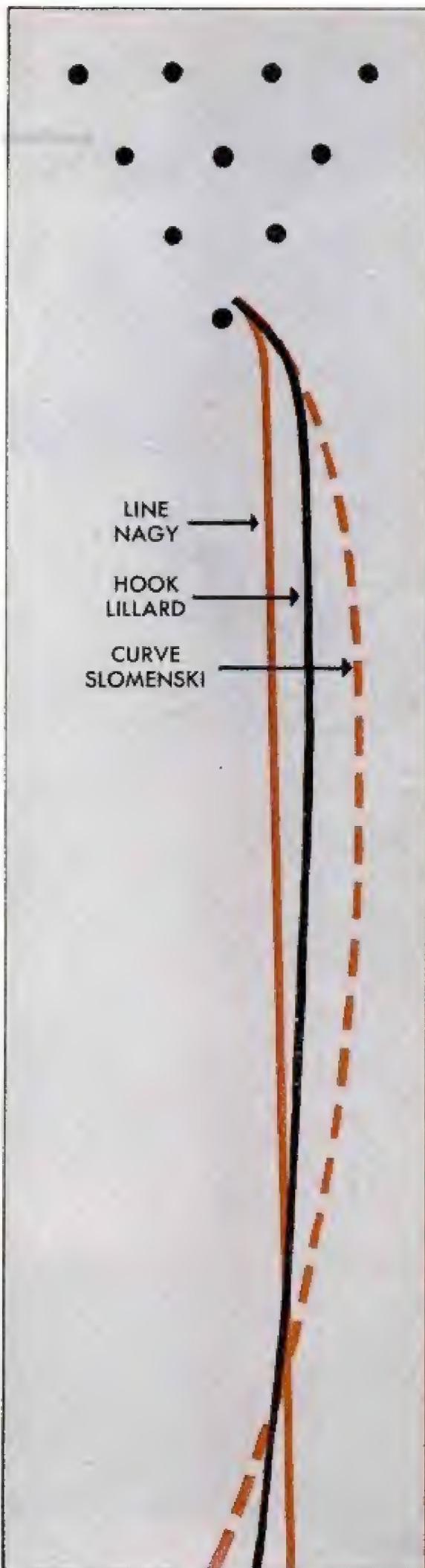
From a mechanical standpoint, at least, the hook isn't overly difficult to throw. Once mastered, throwing it regularly is only a matter of practice and concentration.

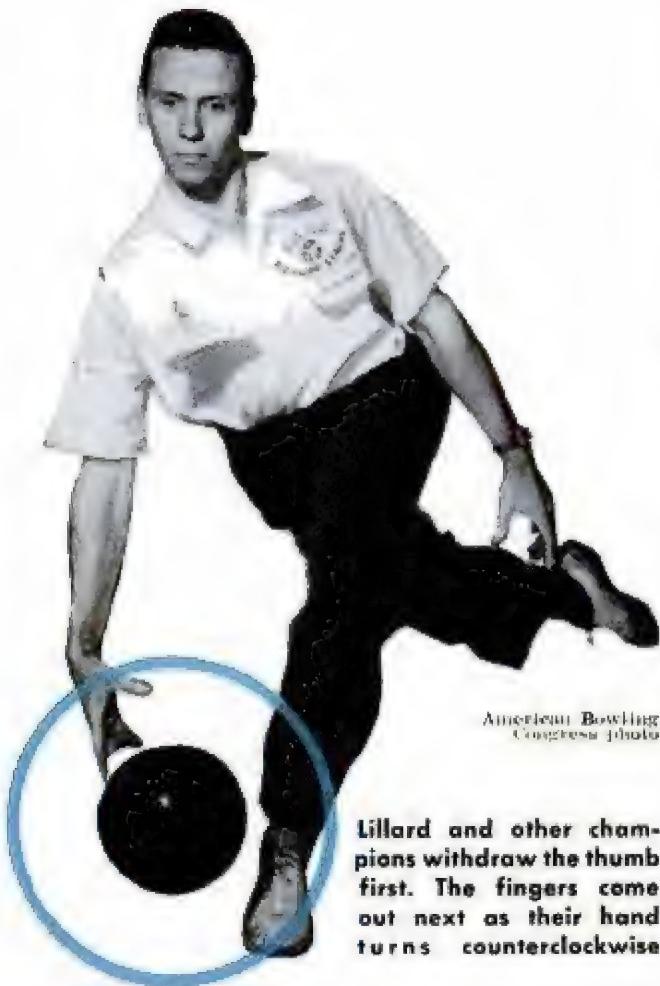
Let's run briefly through the fundamentals of the delivery of a hook or any other type ball. The distance you travel before reaching the foul line, where the ball is released, or how many steps you take to get there, varies with the individual. There is no inflexible rule for either. The length of your legs and the span of your usual stride will be the main determinants. Most players find four steps feel natural and comfortable, but among champs there've been many who took three and five, and a few who even shuffled through a modified two steps.

Much of bowling's mass popularity is because success in it isn't keyed to any particular kind of build, which likewise explains the leeway the game permits in styles. Fat, thin, tall and short men, as well as average individuals, are among the topnotchers. As evidence that power or strength isn't vital, Hank Marino of Milwaukee, voted the outstanding star over the first half of the century, is a slight, rather short man.

Start the ball waist high, centered in front of your shirt buttons. Drop it easily, not abruptly, into the pendulum groove. Keep your backswing low, so that gravity doesn't speed the ball too

Here are examples of the approximate paths of three types of "breaking" balls thrown by Nagy, Lillard and Slomenski





American Bowling Congress photo

Lillard and other champions withdraw the thumb first. The fingers come out next as their hand turns counterclockwise

much as it comes forward. Don't force or push the delivery. A ball descending too fast will drop down jerkily, cheating the bowler out of the lifting action he should get at the last moment of the upswing. This lift supplies the mixing action as the thumb, then the fingers, leave the ball. At this point the bowler's thumb and forefinger form a wishbone parallel to the foul line.

As the fingers come out of the ball, the hand is turning counterclockwise, causing the ball to spin to the left as it moves down the alley. That final lift gives the ball the spin that is the essence of an effective hook. This spinning motion of the ball throws the pins it strikes with more telling effect against the remainder of the pins. In comparison, a straight ball, with no "stuff," generally knocks over few more than the pins it actually hits or pushes over. It gets virtually no help from pins striking the other pins, particularly those in the corners, the 7 and 10.

For best results the hook is thrown so the ball first touches the alley a foot or more beyond the foul line. The spinning action reaches its peak effectiveness somewhere past the alley's halfway mark. Most champions throw the ball so that it passes over a preselected spot 10 to 20 feet beyond the foul line. They use this as an aiming point, knowing from experience the approximate path the ball will follow from

there. It is easier to hit this close-up aiming point, like the sight on a rifle, than to rely on the head pin, 60 feet away.

Broadly classified, there are three kinds of hook balls. They're similar in that all cause the ball to change course and head inward towards the pins. They differ in the paths they follow and the sharpness of that final inward turn.

Steve Nagy of Cleveland, for example, throws a "line" ball. Coholder of the all-time doubles scoring mark, Nagy has a delivery that sends the ball on a relatively straight line, then breaks it into the pocket at the very last moment. Until the last split second it resembles a straight ball, but the short turn at the final moment drives it in with a spinning punch to splatter the pins.

At the other extreme is Stan Slomenski of Newark, N. J., with a sweeping curve that baseball fans would call a "round-house." Stan releases the ball near the center of the alley, but it first heads toward the side before swerving widely back to the center pocket. This is the most difficult type of hook to control and isn't suggested for beginners. One noticeable thing about this pronounced-curve delivery is that its users, like Slomenski, generally release the ball low, with very little loft out onto the alley. With a curve delivery the ball generally contacts the alley only a few inches beyond the foul line.

Bill Lillard, a former Texan now bowling out of Chicago, is a new start with a strong-hook delivery. His ball begins to break sharply about 12 feet out from the head pin, as a rule, though this can be varied to suit alley conditions. Lillard throws the ball with a cupped motion of his hand and forearm, accentuating the spin.

Incidentally, though many bowlers are now inserting their thumb full length into the ball, Lillard puts his thumb in only to the first joint and the fingers in to the second knuckle.

Hook advocates, arguing against the curve-ball delivery, point out that the alley's boards, laid lengthwise, tend to slow up the ball. Traveling across more boards, from left to right and then back again (for righthanders), also tends to make the ball's behavior less predictable, since the wood varies in hardness and polish. While experienced professional bowlers can quickly compensate for these differences, they point out, the once-a-week or occasional bowler isn't skilled enough to make the adjustments.

All the pros and teachers are agreed, though, that a breaking ball—whether it is a hook, curve or line ball—is the most effective way of knocking down all the pins in one toss. Speed and accuracy, alone, isn't enough.

★ ★ ★

Machine Makes Ribbon Bows for Christmas Wrapping

Fancy ribbon bows for gift wrapping are produced at the rate of 150 per hour by a small, hand-operated machine. Each hank of ribbon for a bow is formed by turning a handle which cranks the desired amount of ribbon around a pair of adjustable winding arms. The hank is then manually removed, cut, notched, and tied at the notch with a ready-to-use narrower strip of ribbon. Completed bows can be stored for later use—retailers are thus able to prepare for the Christmas rush in slack periods. An attachment permits production of multicolored bows.



Army "Robot Psychologist" Finds Right Men for the Right Jobs



Input section at right receives and stores data. Operator's console has controls for receiving data from it, computing elements, viewing screen and camera for photographing screen

Army psychologists have a new, complex tool to aid them in finding the right man for the right job. It's a "robot psychologist" with an electronic brain, a memory and a cathode-ray viewer. Statistical results of paper-and-pencil tests given to people already in specific vocations are fed into the machine. A summary of test results appears on the viewing screen as a pattern of dots. A characteristic dot pattern for each job is thus determined, and used in mass testing and placement of recruits. Information not required in a particular problem is stored for future use. Similar problems are solved in days instead of years.

Squeezeless German Accordion Powered by Electricity

German technicians have taken the squeeze out of the "squeeze box" with a new electric accordion. Plugged in and placed on a table, it's played by fingering two keyboards of 41 keys each. The bottom keyboard regulates the pressure of air against vibrating tongues; the top controls electrically produced sound. Switch buttons and dials allow selection from seven different timbres and permit a tremor effect, or allow the top keyboard to play with wind pressure. Two rods projecting downward are pressed by either knee to produce swells in volume.

In seven years, 2800 commercial helicopters have been built in the United States.



Your Car May Need One of



Magnets Hold Visor

Held in position against the windshield metal trim by two permanent magnets, a tinted visor eliminates the driver's eyestrain under strong sunlight. The visor is transparent and does not obstruct view in any direction. It also can be used on a door window.

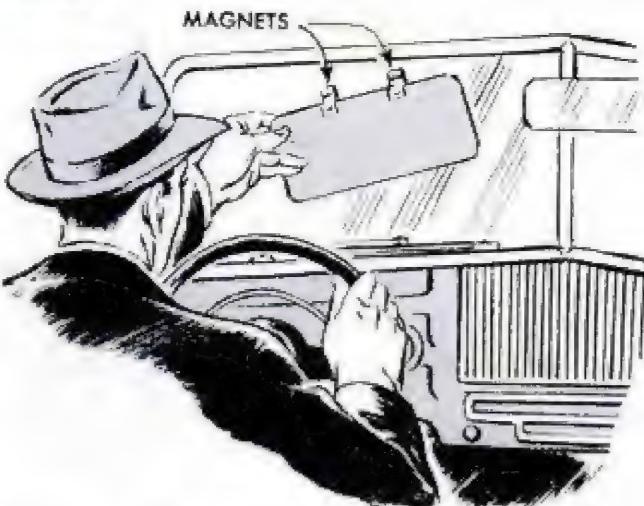
Vacuum-Bottle Rack

Hot or cold drinks are close at hand on long trips when you have a rack that clamps to the bottom of the front seat and holds two vacuum bottles safely. Attached or removed quickly without tools, the rack keeps the bottles upright inside rubber-padded rings.



Mirror Says "Dim Your Lights"

Motorists who insist on driving behind a car with their bright lights bothering the driver may find themselves victims of their own lights. Two Georgia men invented a mirror device that is mounted on the rear shelf so that it aims the light rays back into the eyes of the discourteous motorist.

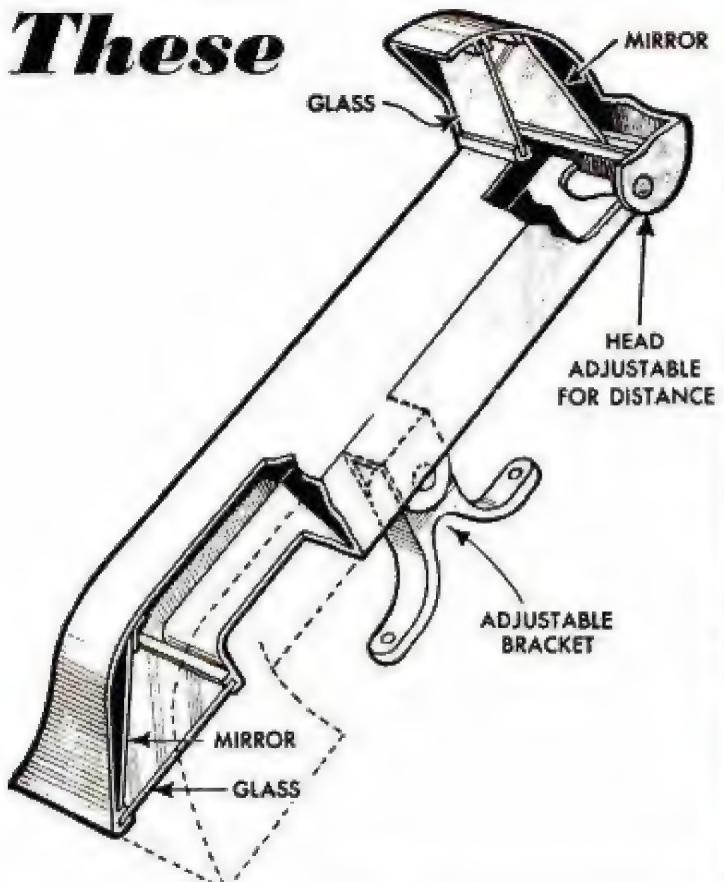


Drip-Mold Latch Locks Rear Door

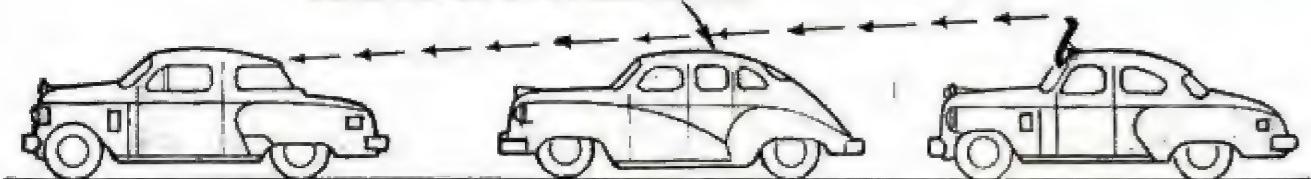
Clamped to the drip molding above the rear door of a sedan, a latch prevents accidental opening of the door while the car is moving. Even though the door handle (either inside or outside) is operated, the door won't open until a lug on the latch is lifted.



These



DRIVER CAN SEE OVER PRECEDING CAR



Periscope Aids Driver in Traffic

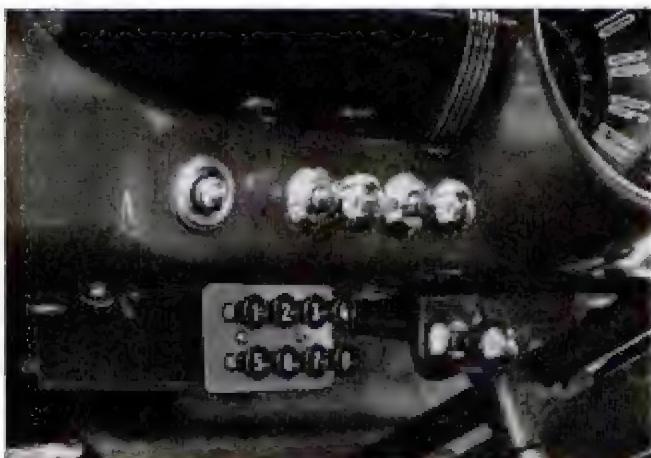
Lines of traffic don't block the driver's vision when he is using a periscope that mounts atop the windshield. With it, the driver is able to look over the top of the preceding automobile. It is expected to prove useful on ambulances, police cars and other emergency vehicles as well as on standard automobiles.

In-the-Car Coffeemaker

Motorists make coffee on the way to work in a German coffeemaker that plugs into the dash. In 10 minutes, coffee is ready. Base of the maker becomes a cup.

Push-Button Ignition Lock

You won't lose the key to your car with a combination ignition lock. You punch out the combination on eight push buttons and the switch turns on. If anyone tries the wrong combination, your horn blasts out an alarm.





Glass "Ambulance" Replaces Car Windows at Scene of Crash

Broken windshields or windows are replaced at the scene of the accident by a mobile glass shop in a pickup truck. The truck carries an electric belt sander for grinding and polishing the glass. It is cooled by a tank of water on the running board. A large chest contains 6000 glass

patterns—enough for all American cars. These patterns are printed on large rolls. The top of the chest is the cutting table. Also included in the truck are racks for glass storage, a supply of window channels, a welding outfit and a hot wire for heating the plastic center of safety glass.

Spot and Trouble Light Housed in Phone Handset

Spotlight and trouble light are combined in a device that looks like a telephone handset and clips to an automobile dashboard. Power from the car's electrical system is supplied through a rubber-covered coiled wire that lengthens to 10 feet for use anywhere about the car as a trouble light. A sealed lamp in the receiver end of the handset is bright enough to use in spotting house numbers or road markers at night. The switch is housed in the "mouthpiece." Installation is simple and quick.

Hook-On Heating Hoses Warm Cars at Drive-In

Pull into a drive-in restaurant near Temple, Tex., on a cold winter day and you'll be supplied with heat as well as food. The car hop takes a big hose off a hook, inserts it in a back window and rolls the glass up tight against the metal outlet. The forced hot air comes from two gas furnaces which feed ducts running the length of two long carports. At each parking space is a length of airplane heating hose with an outlet nozzle. An air-conditioning system, using the same hoses in summer, is now planned.





Buoyant Stone Replaces Wood

ROCK so lightweight it floats, so workable that it can be sawed like wood, is booming business in a small Japanese fishing town.

Easily quarried at a mountain near New Island Village, the porous stone is used in fireproofing large buildings. The volcanic rock is sawed into regular sizes and shapes and then smoothed with a plane. Villagers sell only the best stones, using the rest to construct homes and farm buildings. Lightweight-rock construction has definite advantages in case of an earthquake, as a collapsing house would be less likely to harm the occupants.

The stones have a ready market; a good stone one foot by six sells for the Japanese equivalent of one dollar. As a result, the local villagers are enjoying a period of unparalleled prosperity. They used to work three days in a rice paddy for the same sum they now receive for just one stone.

New Island youngsters, capitalizing on the stone's floating qualities, take a few of the buoyant rocks with them when they go swimming. The stones make good life preservers, they report.



Quarry workman, above left, saws a piece of the volcanic stone as if it were wood. Children, above, use the stones as life preservers. A well-groomed, well-fed hog enjoys attractive living quarters made of the lightweight stone found near Japanese fishing village



WHAT THEY LIKE

POPULAR MECHANICS
CONDUCTED BY FLOYD CLYMER

Hornet □

1. I own a 1953 Hudson Jet or Super Jet Overall
2. It has conventional transmission
3. Speedometer reading now is: 5280
4. I use regular or premium (high test)
5. My average gasoline mileage in city: 19½

6. I add 0 quarts of oil in 1000 miles. I change oil every 1000 miles.
7. Here is what I like best about my Hudson: It is small - easy to park,
handles nice. Good looking. Has plenty of H.P.
to suit my needs.

DENVER, COLO., TRUCK DRIVER

6. I add — quarts of oil in 1000 miles. I change oil every 1500 miles.

7. Here is what I like best about my Hudson: Spry performance,
ease of handling, roadability (at any speed)
and comfort. Top speed is 95 m.p.h.

SAN DIEGO, CALIF., SAILOR

8. I

6. I add — quarts of oil in 1000 miles. I change oil every — miles.

7. Here is what I like best about my Hudson: Small size, short turning
radius, light weight yet big engine, giving very
good power to weight ratio and hot performance

SAN FRANCISCO AIRLINE WORKER

WHAT THEY DISLIKE:

8. Here are my specific complaints: GAS MILEAGE THEY CLAIM IS NOT WHAT
I'm GETTING. POOR PAINT JOB. NOT ENOUGH LEG COMFORT
IN REAR SEAT.

CHICAGO, MACHINIST

9. I rate its roadability*: Excellent Good Unsatisfactory

8. Here are my specific complaints: Door rattle and noise
near front posts. Rain seeps through doors and
body. Doors do not open and close smoothly.

BROOKLYN, N.Y.,
SALESMAN

9. I rate its roadability*: Excellent Good Unsatisfactory

8. Here are my specific complaints: Car is without trim on both sides which I
think would make it more beautiful

9. I rate its roadability*: —

10.

BUFFALO, N.Y.,
CONSTRUCTION
WORKER



REPORT on the HUDSON JET

The true test of a car begins when the owner takes the wheel. Popular Mechanics asked Jet owners from coast to coast about their cars. Here is what they have to say

By Floyd Clymer

DO OWNERS MEAN IT when they say that America needs more good small cars? Hudson aims to find out with the only new name among the 1953 models—the Hudson Jet.

To discover what kind of a car it is to own, drive and live with, *Popular Mechanics* questioned Jet owners from coast to coast.

A very large percentage of them agree on what they like best about their cars. It is the way the Jet handles—48 percent of the owners listed handling and maneuverability among the points they like best.

"Very easy to park . . . turns on narrow streets without reversing."—Brooklyn, N.Y., retired owner.

"Easy riding and parking. Easy driving on mountain roads."—San Francisco railroad worker.

"A short person can drive without banking himself with pillows, yet a tall person can also drive comfortably." Detroit, Mich., teacher.

Close behind handling was performance in the list of favorites among owners. Forty-seven percent mentioned acceleration, top speed, or some other characteristic of good performance.

"Terrific performance. From a standstill to 60 in 10.5 seconds with no lag in power in any speed."—Brooklyn, N.Y., telephone worker.

"Plenty of speed."—Duluth, Minn., factory worker.

"I like its pickup ability and its climbing ability."—Cleveland, Ohio, pipe fitter.

"Drove it up to 85 miles per hour and it handles very satisfactorily."—Detroit, Mich., supervisor.

"Excellent acceleration even from 60 to 80 miles per hour."—Detroit, Mich., truck driver.

"Will out-accelerate 9 out of 10 cars. I can do 98 miles per hour."—St. Louis, Mo., carpenter.

"I have driven this car at 90 miles per hour and no car feels more solid."—Chicago Pullman conductor.

Top complaints were body rattles and the lack of legroom in the rear seat. These were voiced by 13 and 11 percent of the owners respectively.

"Doors rattle and there's a noise near the front posts."—Brooklyn, N.Y., salesman.

"Lots of wind and road noise. Quite a few rattles."—Havre, Mont., telephone worker.

"Rattles, rattles, rattles and very poor on rough roads."—Salem, Mass., insurance broker.

"Hardly any knee or foot space in back seat. Step-down feature makes sweeping floor difficult."—Buffalo, N.Y., carpenter.

"Body is too small for traveling on fishing trips. Space in back seat is too small for anything but the feet of anyone riding there. Not enough room for baggage."—Chicago, mechanic.

"My friends tell me there is no room in the back seat. I don't ride back there so it makes no difference."—Chicago salesman.

Water and dust leaks and poor dealer service were next most frequent complaints—nine percent of the Jet owners listing each of them.

Hiproom in Jet rear seat is 58 inches, enough to seat three easily. Cushion measures slightly less. Hornet cushion is one of the widest in the industry



Percentages from PM Poll of Hudson Jet Owners

GENERAL INFORMATION

Average speedometer mileage.....	3514
Owners using regular gasoline.....	60%
premium gasoline.....	40%
Previous Hudson owners.....	37%
Owners of five or more Hudsons previously.....	8%

RATINGS ON PARTICULAR FEATURES

	Like	Acceptable	Dislike
Visibility, forward.....	98%	2%	0%
Interior styling.....	92%	8%	0%
Visibility, rear.....	92%	5%	3%
Horsepower.....	88%	12%	0%
Riding comfort.....	84%	14%	2%
Exterior body styling.....	67%	30%	3%

PERFORMANCE RATINGS

Average miles per gallon	
city	19.3
country	22.0
Readability	
excellent	78%
good	20%
unsatisfactory	2%
Handling	
excellent	91%
good	8%
unsatisfactory	1%
Structural rigidity	
excellent	51%
good	45%
unsatisfactory	4%
Acceleration from standstill	
excellent	82%
good	17%
unsatisfactory	1%
Acceleration from 50 m.p.h.	
excellent	73%
good	27%
unsatisfactory	0%

"Window vents have tendency to leak."—Buffalo, N. Y., aircraft worker.

"In hard rain, water comes in around doors."—Chicago guard.

"Dealer service has been poor. They certainly will lose out with the kind of service they have given me."—Baltimore, Md., business manager.

"In view of the rotten dealer service, I can't tell whether some of my complaints are warranted or not. I feel that if my complaints were attended to, I'd be much happier with my Super Jet."—Cleveland, Ohio, photographer.

Other complaints included the usual one of poor paint and chrome, about which eight percent of the owners wrote.

"Exterior finish, paint and chrome, are not to my satisfaction."—Los Angeles, aircraft mechanic.

"Paint job isn't too good."—from a Chicago supervisor.

The Jet's body styling did not appeal to six percent of the owners.

"Styling in front is not too good. Hood could be a little lower. Front grille looks like a guppy."—San Francisco clerk.

"Should be lower and wider."—San Bernardino, Calif., jet-engine inspector.

"Rear view exaggerates its narrow

OVER-ALL RATING OF THE JET

Excellent	68%
Good	23%
Average	7%
Poor	2%

BEST-LIKED FEATURES

Handling and maneuverability.....	48%
Performance (acceleration, speed, etc.).....	47%
Compact size.....	34%
Economy	33%
Readability	21%
Riding comfort.....	21%

MOST FREQUENT COMPLAINTS

Body noises.....	13%
Lack of legroom in rear.....	11%
Water and dust leaks.....	9%
Poor dealer service.....	9%
Poor paint and chrome.....	8%
Body styling.....	6%

MISCELLANEOUS

Owners with no complaints at all.....	30%
Would buy another Hudson?	
yes	76%
possibly	21%
no	3%
How is dealer service?	
excellent	31%
good	29%
average	21%
poor	19%
How do you rate the Jet's size?	
just right	87%
too small	13%
too large	0%

width. It appears somewhat out of proportion—width to height."—Chicago engineer.

"Car is without trim on both sides which I think would make it more beautiful."—Buffalo, N. Y., laborer.

Despite these complaints, Jet owners seem to be a satisfied group. In fact, 30 percent of the owners did not list a single complaint on the questionnaire. Sixty-eight percent of the Jet owners rated their cars as excellent over-all. Only seven percent said the Jet is average and a mere two percent described it as poor.

Here are some additional reasons why Jet owners are so satisfied:

"The car has ample room for six persons, yet is not too big."—a Chicago machine operator claims.

"It is small, yet big enough for my family."—Cleveland, Ohio, welder.

"Will turn in a shorter radius than any car."—E. Jaffrey, N. H., lab worker.

Thirty-four percent of the owners put the compactness of the Jet among best-liked features. Economy is also a favorite reason why Jet owners are satisfied.

"Just came off my vacation trip of 953 miles. Bought 37 gallons of gas."—Chicago shipping clerk.

"Returned from 2804-mile trip to Okla-

homa. Used 101 gallons of gas."—Detroit, Mich., owner.

Average mileage of all owners polled was 22 miles per gallon in the country and 19.3 in the city.

Roadability and riding comfort were also top favorites among the Jet owners.

"Holds road well. I rarely tire on long trips. Good visibility."—Brooklyn, N. Y., salesman.

"I like the way it holds the road at a fast rate of speed."—Buffalo, N. Y., salesman.

"Has good roadability despite the fact it is small."—Detroit, Mich., trucker.

"Rides like a dream (wife's comment) and I can relax completely."—Cleveland, Ohio, painter.

"Has the riding comforts of a big car."—Chicago tool and diemaking.

Here are some miscellaneous comments:

"Favorable weight-to-horsepower ratio, handling ease, cornering qualities and step-down design."—Denver, Colo., plasterer.

"Like Hydra-Matic and the Jet is the only low-price car with it."—Fort Wayne, Ind., farmer.

"Bumper and grille of very thin material. I gave a man a push and bent a bumper."—Chicago factory owner.

"It's a good car but costs too much."—Duluth, Minn., sandblaster.

"The clutch is not as smooth as other Hudsons. I believe the wet clutch is more efficient."—Bronx, N. Y., diemaking.

"Boxy body, engine slightly rough and too softly sprung, making sway on the corners, although less than other low-price cars. Don't care much for fake air scoop on hood."—San Francisco, airline employee.

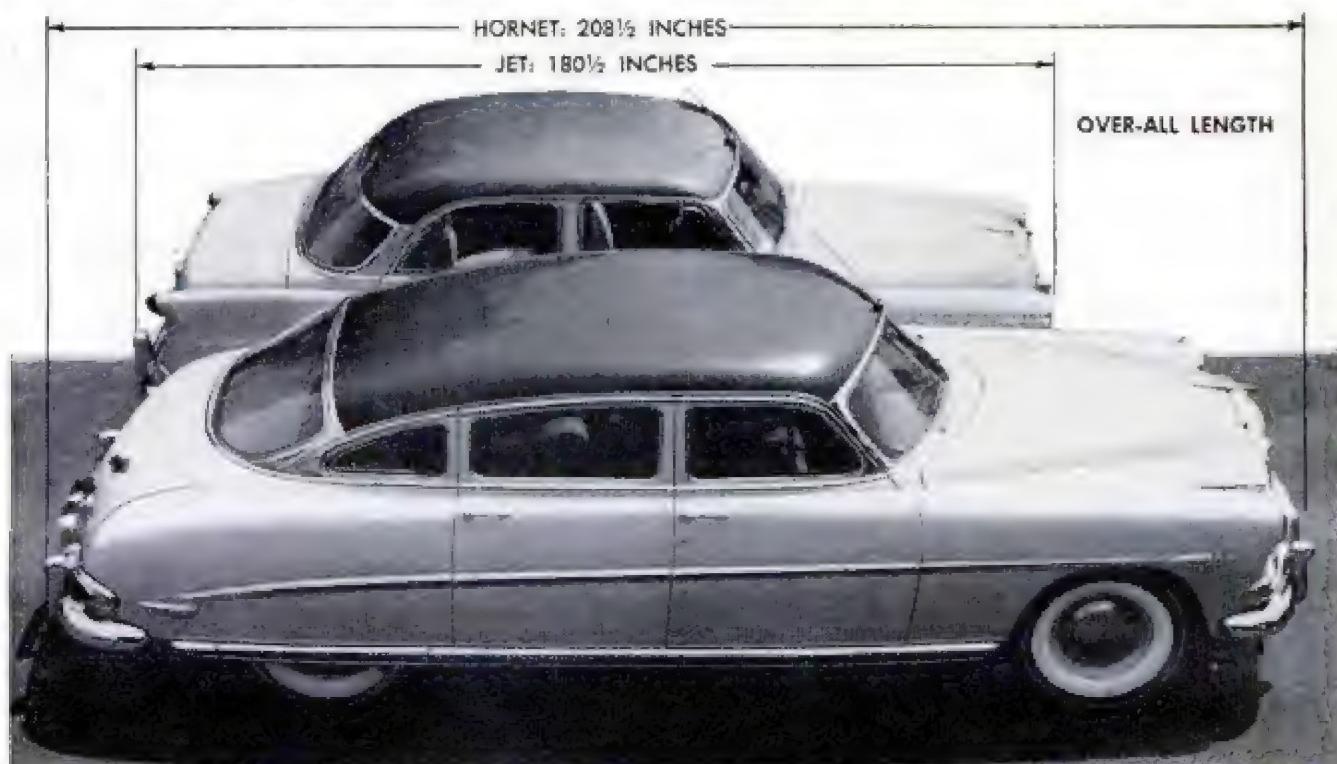
"Can see the road clearly from the driver's seat."—Detroit, Mich., repairman.



Clymer likes the absence of unnecessary top half on the horn ring. Speedometer is large, easy to read



Grille of the Jet is uncluttered, simple to clean and polish. However, one owner said it looked like a guppy's mouth. Below, the Jet and its big brother



"Extreme agility in traffic."—Chicago college student.

"Windows roll up and down easily."—Chicago waitress.

"Should have safety mechanical brakes (under hydraulic system) like other Hudsons."—Cleveland machine-shop worker.

"Real answer to modern traffic, particularly the hills and traffic of San Francisco."—California bottler.

"Ought to have larger shock absorbers. Car also bottoms with 3 or more passengers."—Cleveland, Ohio, decorator.

The fact that most owners are well satisfied is borne out by answers to the question "Would you buy another Hudson?" Only three percent said no; 76 percent said definitely yes; the others answered the question with a possibly.

Thirteen percent of the owners said the Jet was too small, in response to the specific question. For these and other percentages see the table accompanying this article.

And now for my own test: When I took delivery of the Super Jet test car, it was well broken in with 3000 demonstrating miles on the speedometer. I drove the car from Indianapolis, Ind., to Los Angeles, a distance of 2536 miles, which included some off-road testing.

ACCELERATION TEST

1953 HUDSON SUPER JET 4-DOOR SEDAN
with Hydra-Matic and Twin-H Power

1/4 mile from zero	(Drive only)	19.6 sec.
1/2 mile from zero	(Drive only)	30.4 sec.
0 to 30 m.p.h.	(Low only)	4.5 sec.
0 to 60 m.p.h.	(Drive only)	14.6 sec.
Top speed by speedometer		100-102 m.p.h.
Actual top speed		94.95 m.p.h.

BRAKING TEST

Shortest Possible Stopping Distances

At 40 m.p.h.	 79 feet 
At 60 m.p.h.	 178 feet 

ECONOMY TEST

MILES PER GALLON

Constant-Speed Mileage

At constant 30 m.p.h.	24.2 m.p.g.
At constant 50 m.p.h.	21.4 m.p.g.
At constant 60 m.p.h.	20.2 m.p.g.
At constant 75 m.p.h.	17.1 m.p.g.

Cross-Country Mileage

Indianapolis, Ind., to St. Louis, Mo. (considerable traffic)	21.8 m.p.g.
St. Louis to Wichita, Kans.	21.1 m.p.g.
Wichita to Amarillo, Tex. (strong side and head winds across Oklahoma)	19.6 m.p.g.
*Amarillo to Los Angeles (via Phoenix, Ariz.)	22.4 m.p.g.

(Total cross-country mileage: 2536)

* Premium gasoline used on this portion of test only

The car was equipped with twin carburetors (which Hudson calls "Twin-H Power"). It develops 114 horsepower with 8.0:1 compression ratio, using an aluminum head. The Jet has a single carburetor and cast-iron head with 7.5:1 compression as standard equipment.

The car's terrific power and speed are due to the fact that the engine is a large one for the weight of the car (2700 pounds). It has the highest horsepower-to-weight ratio in its price range.

The 202-cubic-inch L-head 6-cylinder engine is of conventional design. Hudson sticks to a long stroke—4.75 inches with a bore of only 3 inches.

Any skeptic regarding the power, speed, handling and acceleration of this short (105-inch) wheelbase car will find the surprise of his life when he gets behind the wheel.

The car has amazing performance. It literally flies up the hills and getaway from traffic signals is incredible. It will cruise mile after mile at 90 miles per hour. Top speed was 100-102 miles per hour by the speedometer (fast by about 6 percent).

The engine is smooth with very little vibration and under no circumstances, even in the heat of the desert, did it overheat.

The handling characteristics are a little hard to describe. There is some road wander in crosswinds. The narrow tread (54 inches front and 52 inches rear) coupled with extremely soft front-end suspension tend to cause considerable up and down floating of the front end, especially at high speeds. There is considerable roll on sharp corners. Yet the car is easy to handle. There is a good feeling of safety and it is easily controlled at all times. The soft front springing does provide a comfortable ride, but it is much too soft for high-speed work or fast cornering. It should have heavier shock absorbers as well as stiffer springs in the front.

The splay-mounted rear springs (positioned at an angle) and the diagonally mounted rear shock absorbers give a comfortable rear-seat ride for a car of the Jet's size. It rides as well as some larger cars, but there is some rear-end hop on rough roads.

I found regular gasoline to be satisfactory, as did 60 percent of the Jet owners who answered our questionnaire. Gasoline economy was good and would have been even better with the single-carburetor or overdrive equipped Jet. Top speed and fast acceleration naturally increase gasoline consumption.

The servo-action hydraulic brakes are good, although at times there were some squeaks. There was little fading, even in

(Continued from page 304)

Detroit Listening Post



By Leo Donovan

BEFORE THE OLD race is over, a new one begins!

With Chrysler Corporation bringing out its 1954 models in October, the competition completes the cycle as the year's fourth quarter begins. From now on, the merry-go-round will gain momentum until the last of the new models makes its appearance.

More power under the hood and easier control on the wheel appear to be the dominant theme in the 1954 models.

Plymouth is expected to unveil its own power steering as a feature of its new line. It will be of the linkage-booster type, designed by its own engineers. Gossip has it that the price will be lower than that of competitors. **Plymouth's** Hy-Drive, the no-shift transmission, will be continued.

The theory that motorists want improved performance in each new-model crop will be supported by the carmakers with the presentation of higher-horsepower engines in 1954. **Chrysler** probably will lead the pack with a 235-horsepower engine.

Cadillac has a 250-horsepower engine in its experimental Le Mans model, but it isn't expected to market such a powerhouse in a standard car this year. The plans of General Motors in the horsepower department are still in engineering laboratories.

Packard is a dark horse in the power race. For two generations, **Packard** engines have won acclaim for their superior qualities. Don't be surprised if **Packard** zooms into the lead with the largest engine and highest compression ratio of the season.

It is doubtful whether **Chevrolet** and **Pontiac** will bring out their awaited V8 engines in the 1954 models, although engineers were hopeful earlier that tool-and-die production could be rushed to accomplish the change-over.

The most popular V8 engine in the world, the **Ford V8**, is due for a change this year, according to Detroit gossip. It and its bigger brother, the **Mercury**, are expected to have overhead valves. **Mercury** is also believed to be planning a special model of the sports-car type. What it will be is still

a mystery, but it is expected to open some eyes among industry stylists.

Speaking of stylists, those at Chrysler Corporation have been given new design freedom, which will mean improvements over what the designers facetiously call "executive styling." In the parlance of the trade this describes the influence of top management over the drawing board. Because of this new freedom, we will await with interest the **Plymouth**, **Dodge**, **DeSoto** and **Chrysler** lines for 1955.

Studebaker, **Nash**, **Willys** and **Kaiser** are not expected to make much more than identification or face-lifting changes this year. Both **Studebaker** and **Nash** have styling that is comparatively fresh from the designer's board and will probably go along with minor changes for a while. **Nash** engineers are still working on the **NKI** (which started life as the **NXI**), the car that the corporation bets will make an impressive showing in the lowest-price field.

Willys and **Kaiser**, now brothers after their combination, are currently involved in straightening out the confusion that always accompanies such an amalgamation.

Edgar F. Kaiser, president of both companies, said they would introduce new models in 1954 and would depend upon the demand for five kinds of vehicles to build towards their goal of four percent of the market—meaning both the passenger and commercial-vehicle fields. Elaborate plans have been drawn for merchandising the **Jeep** and other four-wheel-drive vehicles, as well as the **Kaiser**, **Henry J** and **Willys** passenger cars.

When the new **Cadillac** makes its appearance with higher fenders, we're informed, it also will be one of the first to come out with the wrap-around windshield. Corner supports will be moved back and that will give the driver a lot more visibility and will eliminate the dangerous blind spot to his left. And engineers say they have solved the problem of excessive glare.

Remember how fast the hardtop styling caught on? Most industry observers are convinced that the wrap-around windshield will capture the public fancy just as fast.

Motorists who have been looking forward to a general decline in car prices need not expect such a step to be taken soon by the manufacturers. True, dealers began giving discounts on some hard-to-move models during the year and there were a few cases of price cutting. But, altogether, the rate of new-car sales found few carmakers worried about the market's ability to match production schedules. Some may make a few optional accessories standard equipment on the new models, but they aren't likely to begin cutting prices unless production suddenly and greatly outdistances sales.

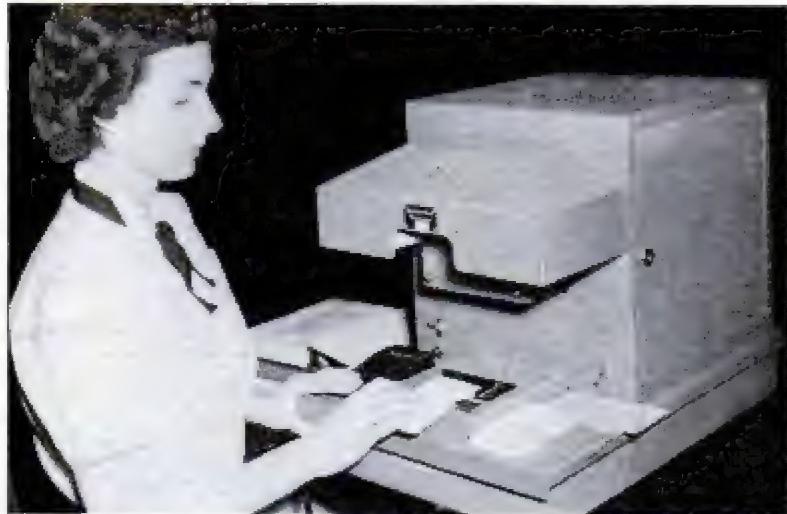
Magnet on Lift Truck Spots Freight-Car Runways



Heavy steel runways, the flat metal sheets that serve as "gangplanks" between freight cars and loading docks, are put into position easily and effortlessly by a portable electromagnet that slips over the fork of a lift truck. Normally, it requires four men to move the 300-pound sheets into position. With the lift, two sheets are picked up at a time and lowered into position. The truck's storage battery provides the necessary power.

Librarian's Helper Checks Out Books By Photographing Cards

Library books are charged out quickly and without chance of error by an automatic camera that photographs the data for filing purposes. Book card, due-date card and the borrower's library card are all placed on a shelf in the machine and photographed simultaneously when a foot lever is pressed. Should the book become overdue, the librarian can refer to the photographic record. The information is recorded on long rolls of sensitized paper which are automatically transferred to a light-tight box as they are used.

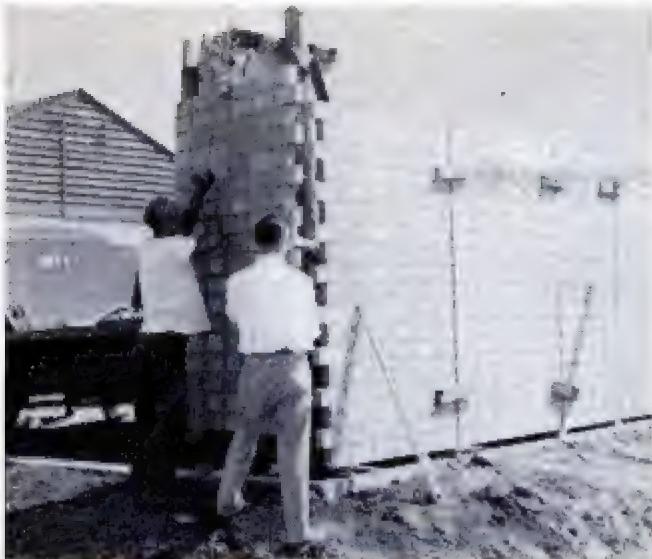


Electrical Music Mentor Buzzes When Pupil Hits Sour Note



Piano pupils learn their scales with the aid of an electrical device that fits on any keyboard. When a student practices scales, he sets a dial for a certain music key. As he plays, a light flashes on the device before him to indicate the position of each correctly played note, but a buzzer sounds if he's wrong.

More than 422,000,000 miles were flown by company-owned aircraft in the United States last year, compared with 457,000,000 miles flown by the scheduled domestic airlines during the same period.



Workman, left, lowers a large brick-wall panel into place. Panel fireplace at right is assembled in an hour

Home Built in a Day With Precast Brick Panels

Precast brick panels in sizes up to eight by five feet enable a small crew to erect a home in a day. Reinforced vertically and horizontally with steel rods, the panels can withstand 50 tons of pressure though they are only $2\frac{1}{2}$ inches thick. Labor cost in erecting a model home with a wall area of 700 square feet was 16 percent less than that required by a similar brick home. Be-

cause wall thickness was reduced, the home had six percent more living space than a brick house of equal dimensions. Wall construction took 39 man hours—19 hours for wall erection and 20 hours for grouting; the roof structure was put in place before joints were grouted. The panels may also be used for garages or for building an outdoor fireplace from a kit.

"Terraced" Apartment in Denmark Has Foam-Rubber Floor

Three terraces covered with foam rubber occupy a living room-bedroom designed by a Danish architect. "Chairs" are rings of foam rubber, supplemented by knee rests. Compact and comfortable, the arrangement allows you to lounge almost anywhere in the room.

"Pumping Up" a City With Rainwater

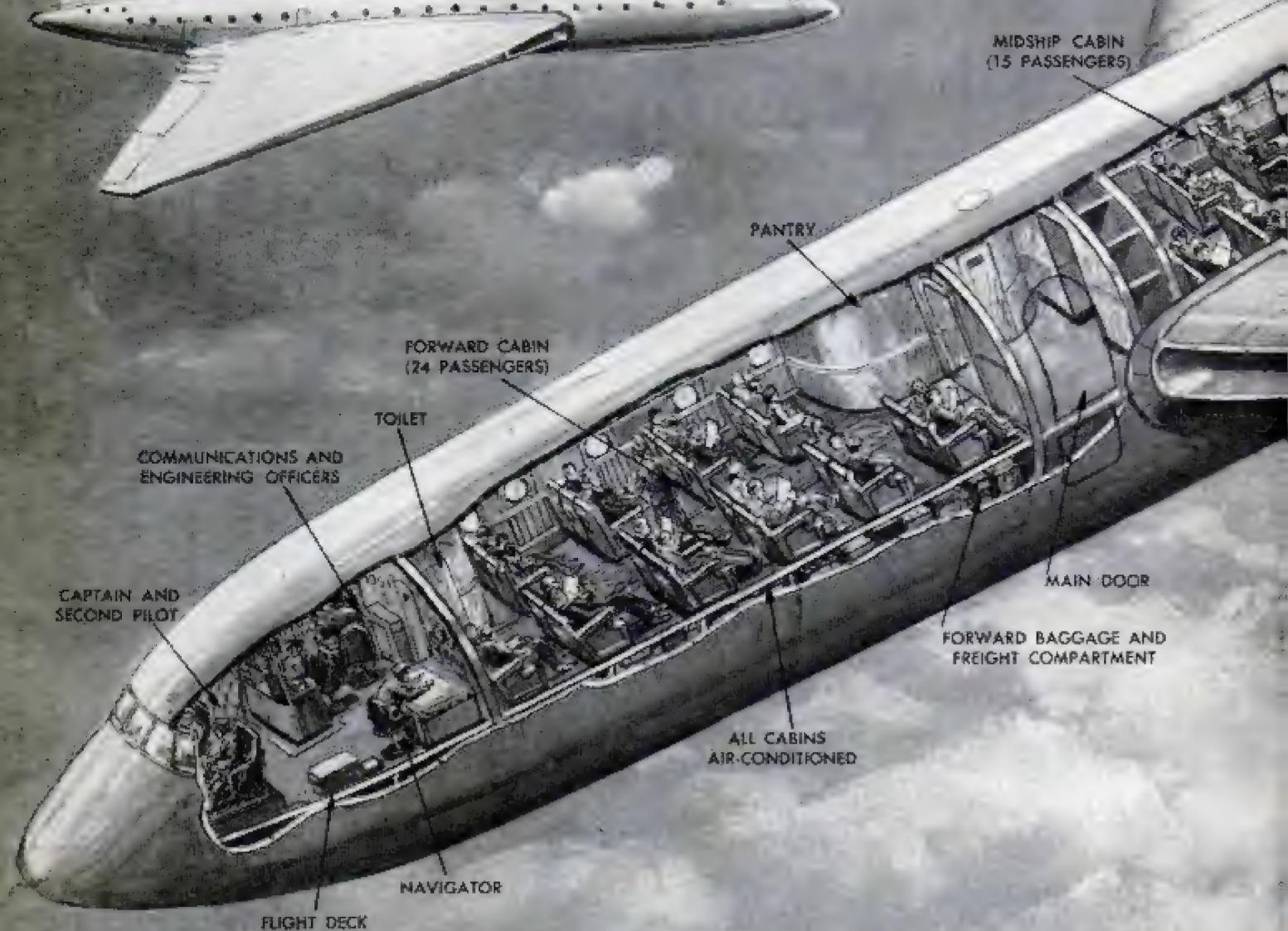
Hydraulic engineers are studying ways of "pumping up" Mexico City, which has been sinking at a rate of a foot a year since 1948. The soil structure under the city is 85 percent water, which is pumped out to supply the residents. The engineers plan to restore the soil's equilibrium through new rehydration wells that will pump the overflow rainwater back down into the subsoil.



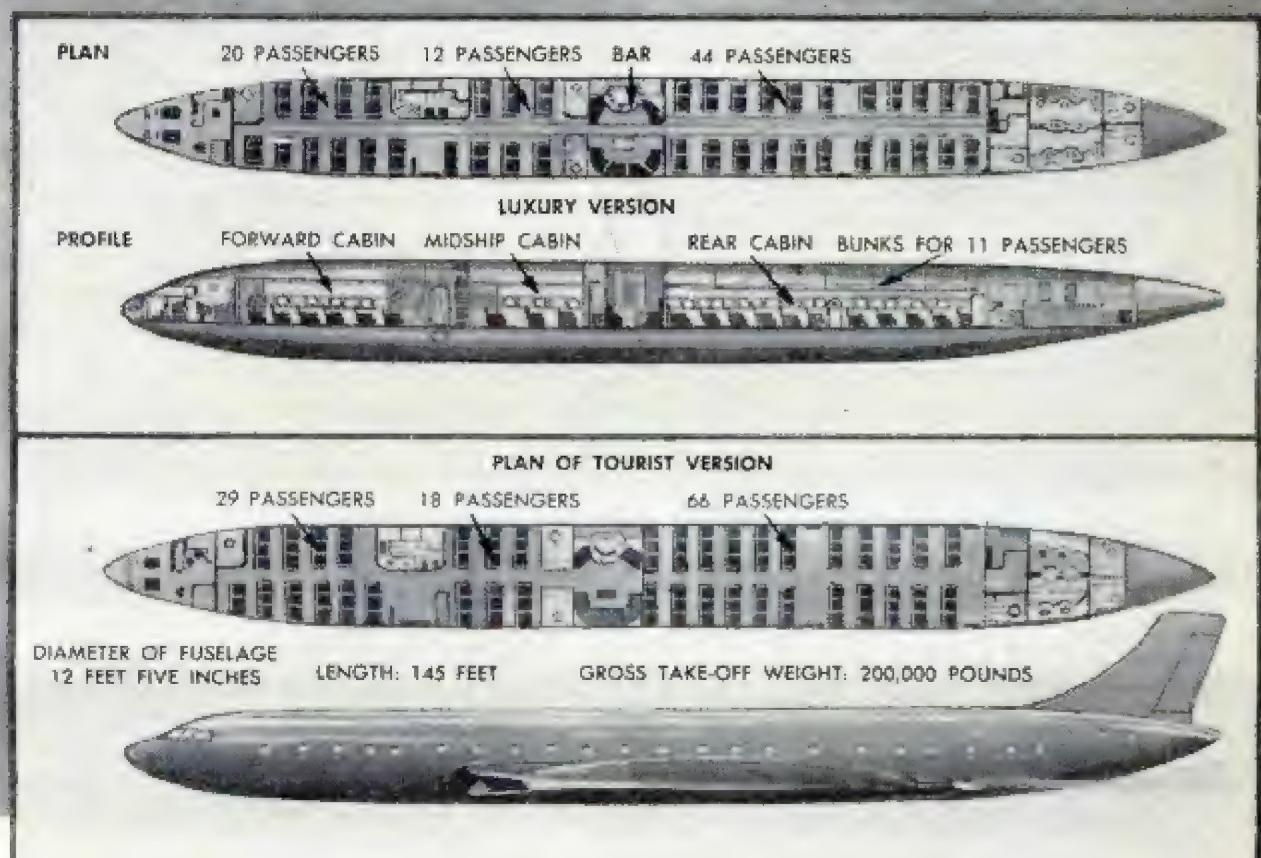
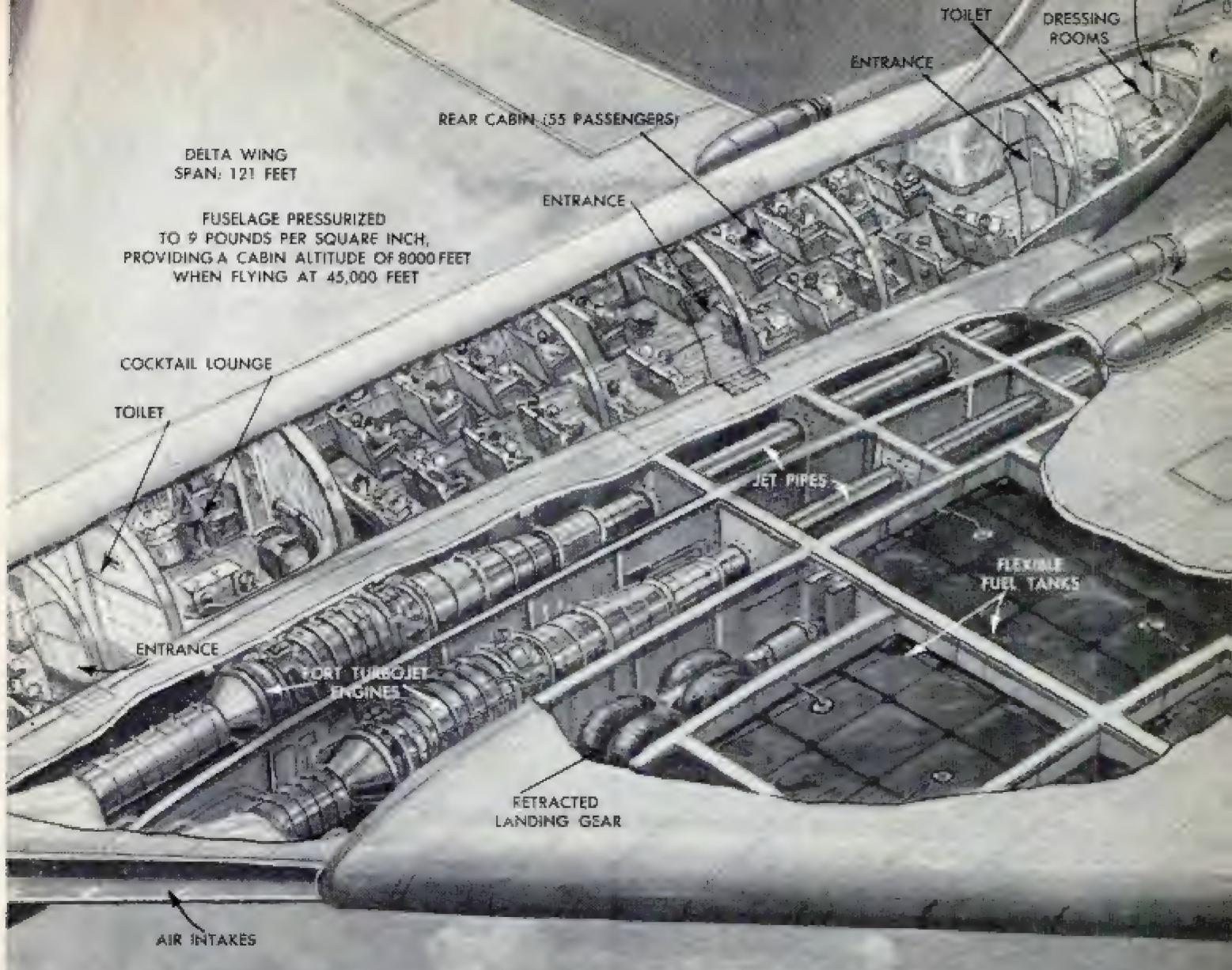


AVRO ATLANTIC

CRUISING SPEED OVER 600 MILES PER HOUR
CRUISING ALTITUDE OVER 40,000 FEET



MORE THAN 100 PASSENGERS will be able to fly through the stratosphere between London and New York in five to seven hours in a jet liner to be built in England. It will cruise at more than 600 miles per hour. Called the Avro Atlantic and scheduled for completion in 1958, it is a development of the Avro Vulcan bomber now being built for the British Royal Air Force. Its delta-wing design will put the exhaust ends of the four turbojet engines, where the noise level is highest, well behind the rear passenger seats. All the passenger seats will face the rear, an arrangement recommended by many safety experts. With the entire fuselage pressurized to nine pounds per square inch, the cabin "altitude" will be only 8000 feet when the airliner is flying at 45,000 feet. A luxury version of the Atlantic, with all seating two abreast, will carry 76 passengers, while a tourist model of the huge plane will comfortably accommodate as many as 113.





Continuous length of metal goes up over the top of the roof and down the other side

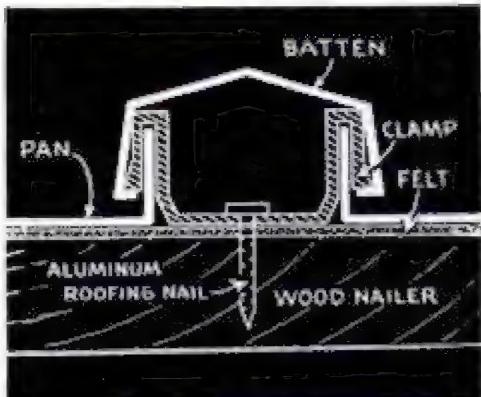
Rolls of sheet aluminum feed machine, which turns them into battens and roofing panels cut to desired size

Machine Forms Roofing at Homesite

TWO MEN CAN INSTALL a permanent aluminum roof on the average house in one day, using a machine that forms the roof panels right on the job.

Coils of 16-inch aluminum sheet are fed into the machine, which turns up their edges and cuts them in lengths that fit the roof. A narrow strip of aluminum that goes into the machine at the same time comes out in the form of a continuous batten strip for covering the seam between adjoining panels. Clamps that are nailed into the subroof hold the panels and batten strips in place.

The system may be used for recovering old roofs, for new construction, or application of aluminum siding. The design of the battens permits expansion and contraction due to temperature changes, yet prevents leaks. The rustproof, fireproof roof has a high insulating quality and is guaranteed for 25 years.



Cross-section drawing shows how panels are joined by overlapping clamp that is topped by batten. Below, finished roof laid with the portable machine





Raiding team cuts 25-hp. motor and switches to oars when close to shore. Large 2450-pound model carries nine

Marine Reconnaissance Boat Has Multiple Cells

MARINES ENGAGING in midnight patrols along enemy beaches will skim to shore in a boat made of inflated rubber tubes. A constantly taut nylon-fabric hull insures rigid-boat performance. Enemy fire must damage over 11 of the 22 tubes before the boat becomes inoperable; bladders can be replaced with the boat in motion.

A 4-man, 14-foot model carries 1100 pounds and weighs 95 pounds deflated. The 9-man, 18½-foot model carries 2450 pounds and weighs 142 pounds deflated. Plopped into the water from a helicopter or launched from boat, shore or submarine, the boat inflates in 30 seconds with gas cylinders.

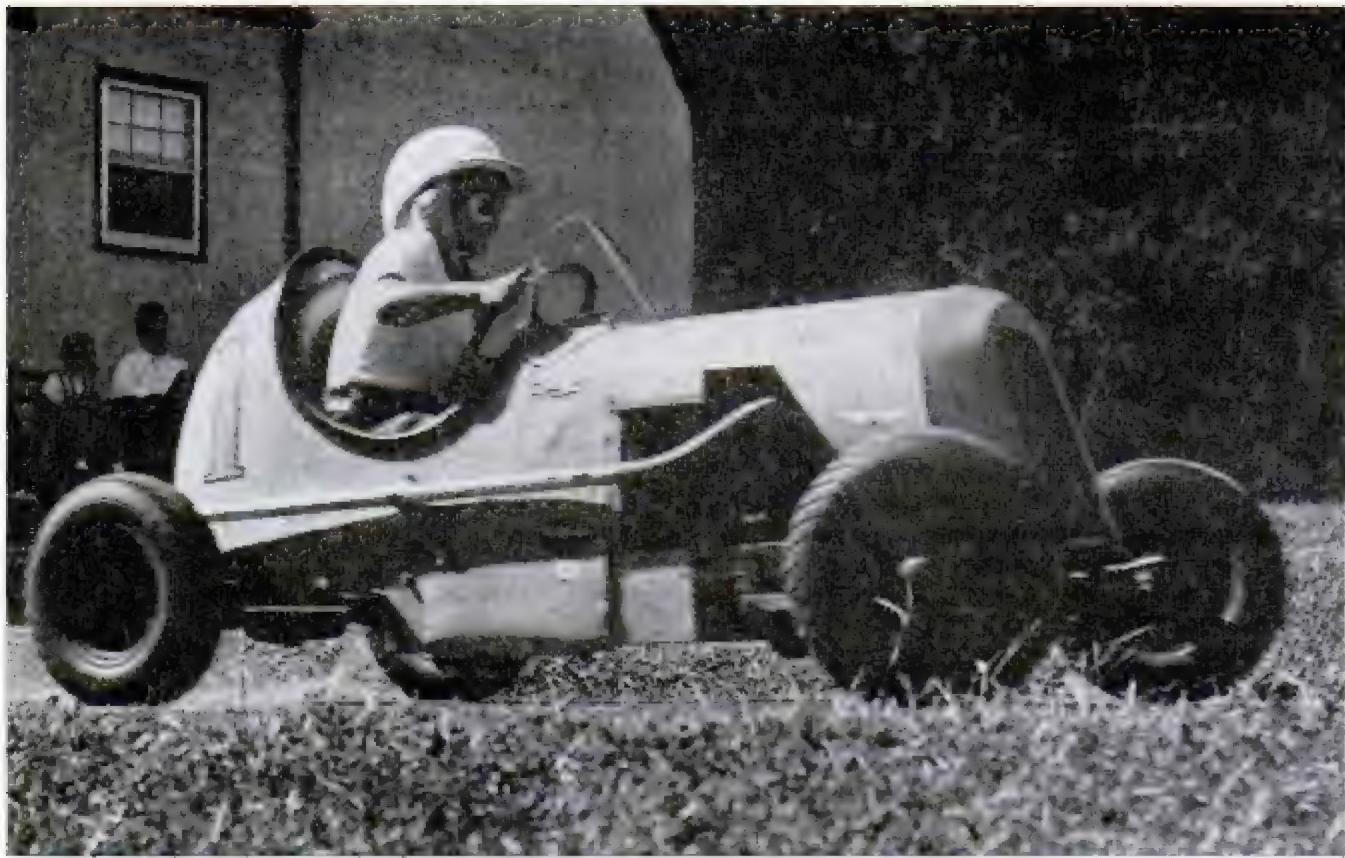
Paddles, a 10-horsepower outboard motor for the small boat or a 25-horsepower motor for the big boat propel the craft. Top speed is over 20 knots. Loaded speed is 12. Arms and equipment used in reconnaissance, rescue work and transportation are firmly secured even if the boat capsizes.



Carbon-dioxide cylinders inflate boat in 30 seconds

Four-man model churns water in test run. Rigid hull allows high speed, easy handling, excellent maneuverability





Six-year-old Paul Vilardi spins around a turn in a souped-up one-cylinder midget built by his racing father

Hot Rod, Junior

TIRES SCREAMING, a pair of midget automobiles buzz around a sharp turn on a little track in suburban New York. Huddled low in the cockpits are five-year-old Billy Amado and six-year-old Paul Vilardi, junior hot rodders who learned to race before they could read.

While other kids in the block play with tricycles, Billy and Paul don crash helmets,

climb into their own gasoline-powered racers and fasten safety belts. Then, at speeds approaching 20 miles per hour, they roar around a 90-by-50-foot track near Billy's home.

The fun began in 1951 when Paul, then 4½, showed signs of following in his father's footsteps. Dolph Vilardi is one of the leading amateur sports-car-competition drivers

Vilardi swings wide of corner as his five-year-old competitor takes lead. Cars' top speeds are 18 and 15 m.p.h.





Paul Vilardi's father, who started it all, winning 750 cc. sports car class in 1952 Grand Prix road race

in the country. Last year, driving a Crosley Special, he took first place and the Queen Catherine Cup in the 750 cc. sports-car class of the Fifth Annual International Grand Prix races at Watkins Glen, N. Y.

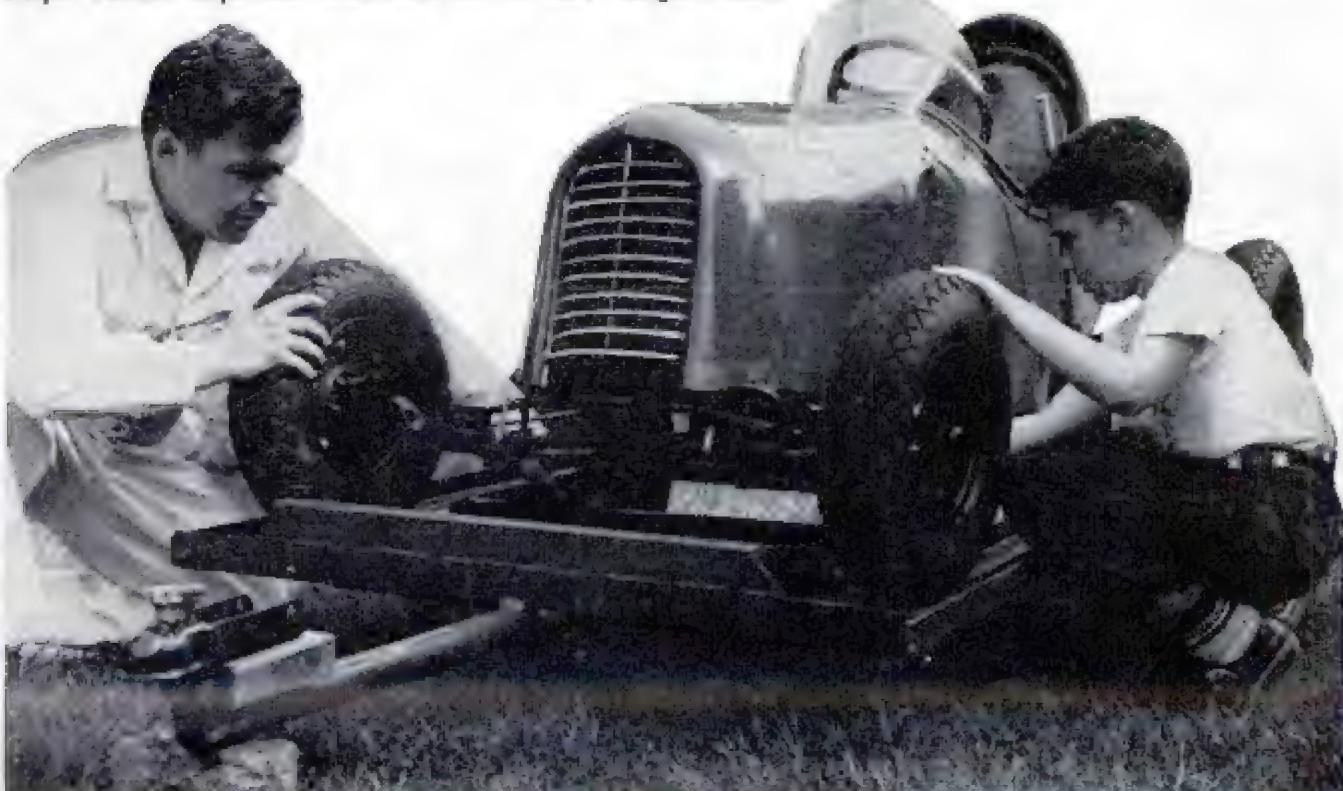
From the angle iron of an old bed Vilardi fashioned the frame of his son's racer. The drive shaft, steering mechanism, axles and body came from a 1936 Crosley.

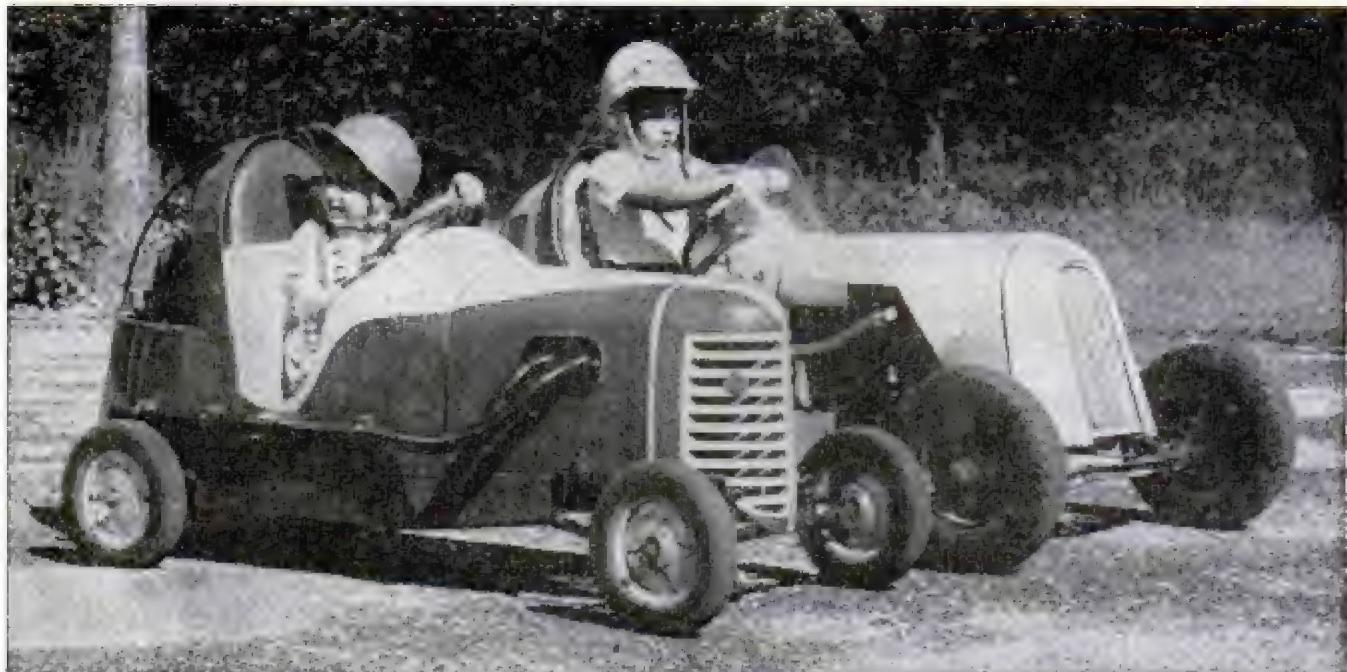
Five inches were cut from the center of

the front axle, $2\frac{1}{2}$ inches from each side of the rear axle. The transverse front spring was adapted from Crosley front semielliptic leaves. The rear springs are quarter elliptic, made by halving a Crosley front spring.

A 1934 Dodge furnished the grille and pneumatic-tired wheelbarrows the wheels. A $1\frac{1}{2}$ -horsepower Briggs & Stratton gasoline engine like those on power mowers

Dolph Vilardi helps son lock racer on its own midget trailer





Billy's car, left, is rear-engine job with chain drive. Forward engine in Paul's car powers drive shaft

serves as the power plant. By enlarging and polishing the intake-manifold ports of the engine, Vilardi has increased its output to about two horsepower. The completed car is about five feet long and three feet wide across the wheels—about three quarters of the size of a regular midget racer.

Six months after he began work on the racer, Vilardi started the motor and climbed aboard the completed car, one foot on the tiny seat, the other on the gas pedal. The midget leaped forward as Vilardi struggled to retain his balance. "It was going about 30 miles per hour, and almost threw me off," he reports. Despite Paul's objections, the car was geared down to six miles per hour after that wild ride.

After six weeks, however, the speed was

Hopped-up Briggs & Stratton in Paul's car has centrifugal clutch that drives through sprocket on end of modified Crosley torque tube. Crosley steering box has welded extension. Left, gas tank



increased slightly. Gradual boosts have since brought it to 18 miles per hour.

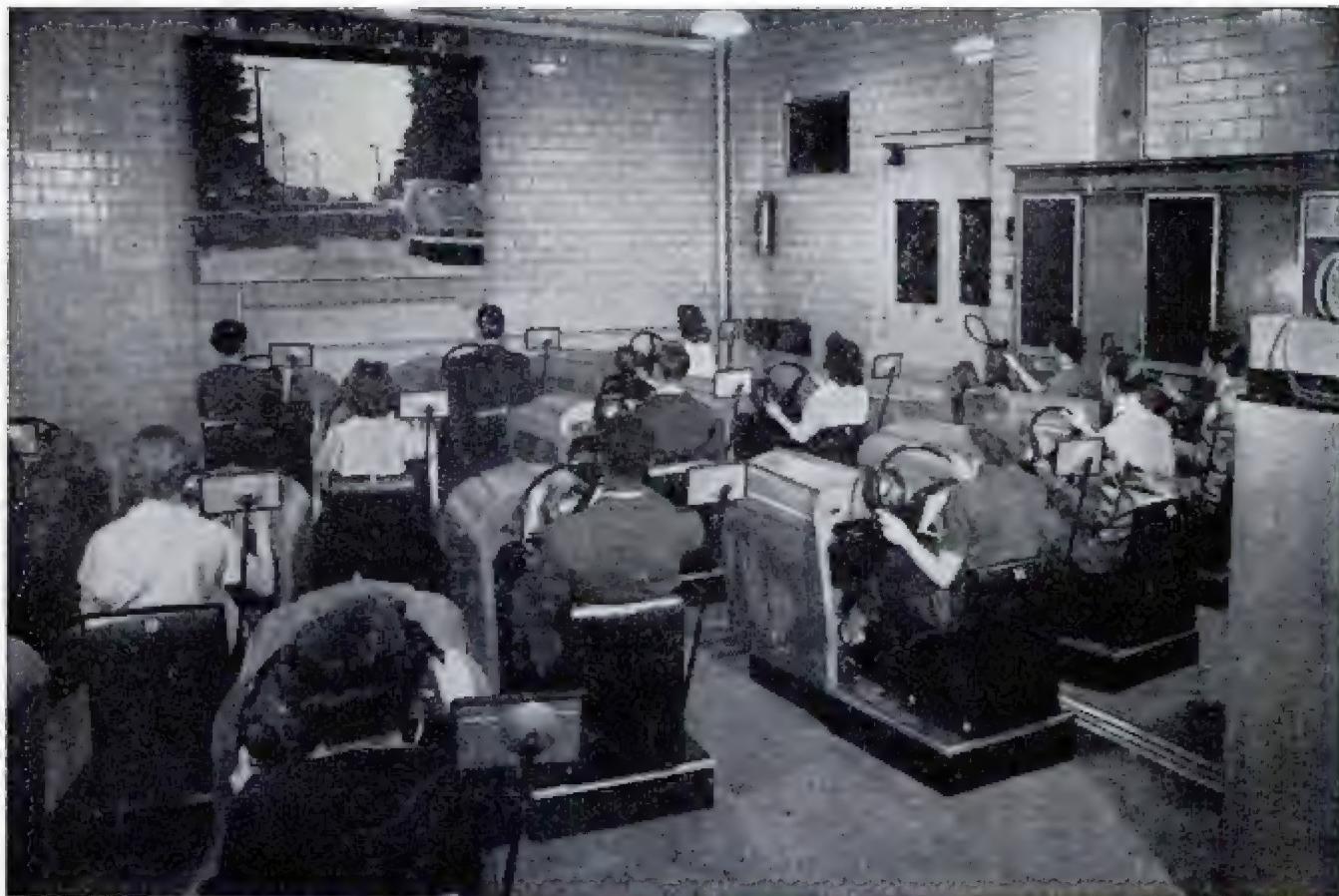
Among Paul's friends was another youngster who longed to become a track burner with a car of his own. Soon Ray Amado was at work on a rear-engine racer for his son Billy. Last summer Billy piloted his own car on its first test run around a .05-mile track built near the Amado home in Garverville, N. Y.

Billy's racer is the same size and is powered by an engine identical with the one in Paul's car. However, the only auto parts used in its construction were a Crosley steering mechanism and a grille from an Austin Bantam. The rest of the car, including its chain drive to the rear wheels, Ray Amado built himself.

At present Billy's car will hit 15 miles per hour. As a result, Paul's car can zoom around the track six times in a minute, while Billy makes five revolutions.

But Paul's yellow racer isn't always the winner. Often Billy will cut his midget sharply inside Paul's on a turn, bear down on the throttle, adroitly pull out of the forced skid and into the lead, leaving Paul biting dust on the turn.

Both boys are excellent drivers and have never had an accident. The cars are tipproof; safety helmets and safety belts are always worn during races, which are supervised by their fathers. Speeds are not greater than they would reach on unprotected bicycles. But to envious young neighbors who flock to watch the races, the miniature track is Le Mans and Indianapolis rolled into one. ★★★



No fenders are wrinkled as students learn to drive on a "highway" projected on a movie screen. Right, backing is practiced by watching highway in a mirror

Students Learn to Drive In Safety of Classroom

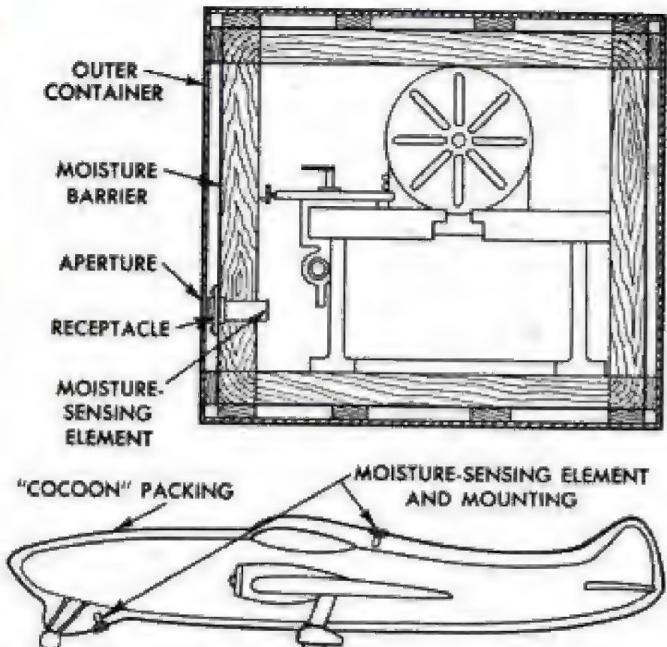
Although their "cars" never move, student drivers travel down a "highway" and meet all traffic conditions in a New York City schoolroom. Making this possible is the Drivotrainer, developed by the Aetna Casualty and Surety Company. Conventional controls are built into 15 cars arranged in rows in the classroom. The students watch a movie screen at the front of the room on which a moving highway scene is projected. An automatic-scoring system is built into the training aid. Attached to the seats, behind the right shoulder of the drivers, are mirrors into which the students look when driving backwards. The course covers everything from simple starting and stopping to driving in city traffic.



Flexible Coating Turns Wood Floors Into "Concrete"

Coating materials that are mixed and applied like plaster or concrete but require no anchoring clips or expansion joints can be troweled over wood or masonry to provide a wear-resistant surface. Similar to concrete, the new materials use latex-water emulsion binders instead of water alone. Two types of the material have been developed. Both are tough and flexible and have outstanding adhesive qualities. In one

type, the waterproofing qualities are stressed, making it excellent for roofing purposes. The other is designed to provide a long-lived surface coating for floors, platforms, sidewalks and driveways. A quarter-inch coating, tests have shown, has the resilience of wood and better wear resistance than concrete. The coatings can be used over masonry, concrete, plaster, wood, glass or metal.



Moisture-Sensing Element Sealed Into Container

Moisture which might rust stored equipment is detected by an element which is sealed into the side of the package. The sensing element consists of a tiny plastic cylinder with a dual winding of precious-metal wire, a coating of moisture-absorbing compound and plug-in contact pins. A portable unit powered by dry battery is plugged

into the sensing element, sends a charge through the element, and measures the electrical resistance on a meter. Since resistance is determined by the amount of moisture collected on the element, this tells the inspector the dryness of the packaged contents. The system was developed for use in Army Corps of Engineers warehouses.

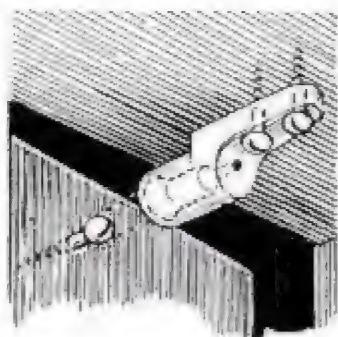
Humming Detector Unit Spots Hidden Conduits

Plastered-over conduit and wall boxes are quickly located by an electronic detector. Holding the instrument an inch away from the wall, the operator quickly "sweeps" a large area. A loud hum signals the presence of a conduit or wall box. Weighing only 3½ pounds, the detector uses low-cost tubes and dry-cell batteries.



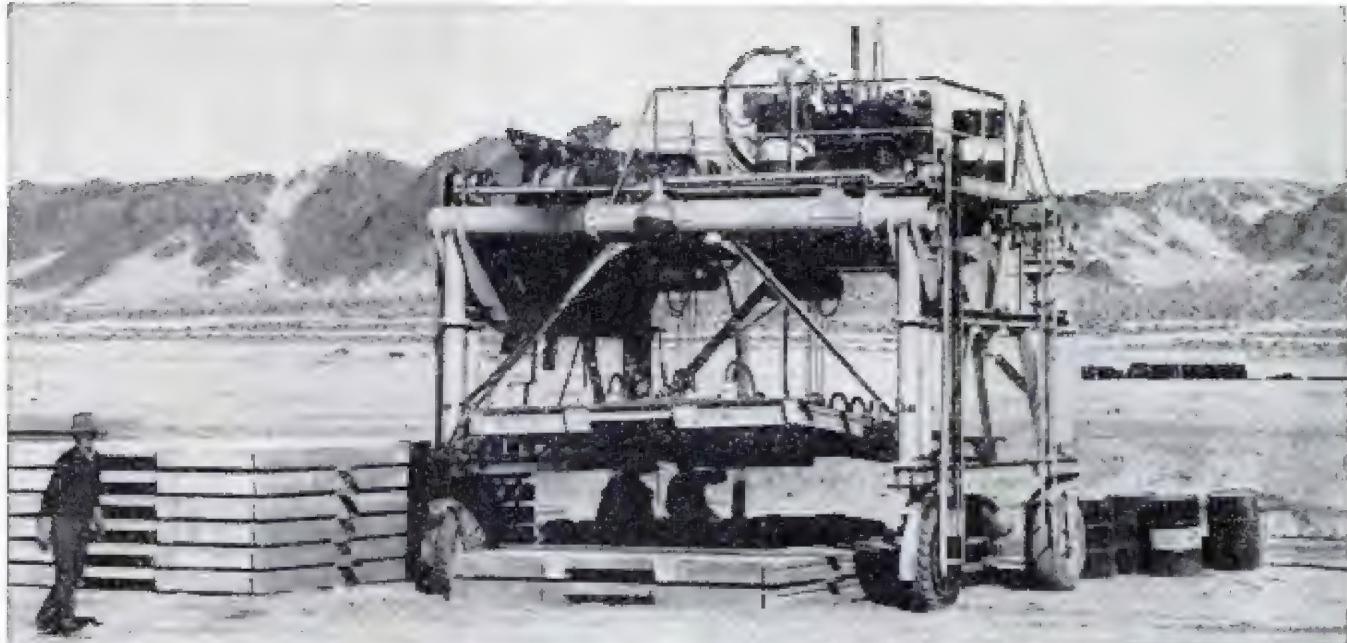
Plastic Friction Catch Holds Cupboard Door

Simple to install and operate, a plastic friction catch holds a cupboard door closed tightly yet releases it smoothly when the door is pulled open. The catch is simply a tapering tube of flexible plastic attached to a shelf. A ball-headed screw is attached to the door. When the door is pushed shut, the ball headed screw is forced into the tapered tube and held tight by friction. The plastic fixture will wear indefinitely and results in quieter closing of cabinet doors.



Chickens Play Baseball,

pigs vacuum rugs and rabbits careen down slides at a little farm near Hot Springs, Ark. The farm is the laboratory of a pair of psychologists who have converted animal training into a precise science. What's more, they say anyone can teach a hen, dog, bull or hamster to do tricks. You'll learn their training techniques in "Who Says Animals Are Dumb?" coming up in the November issue.

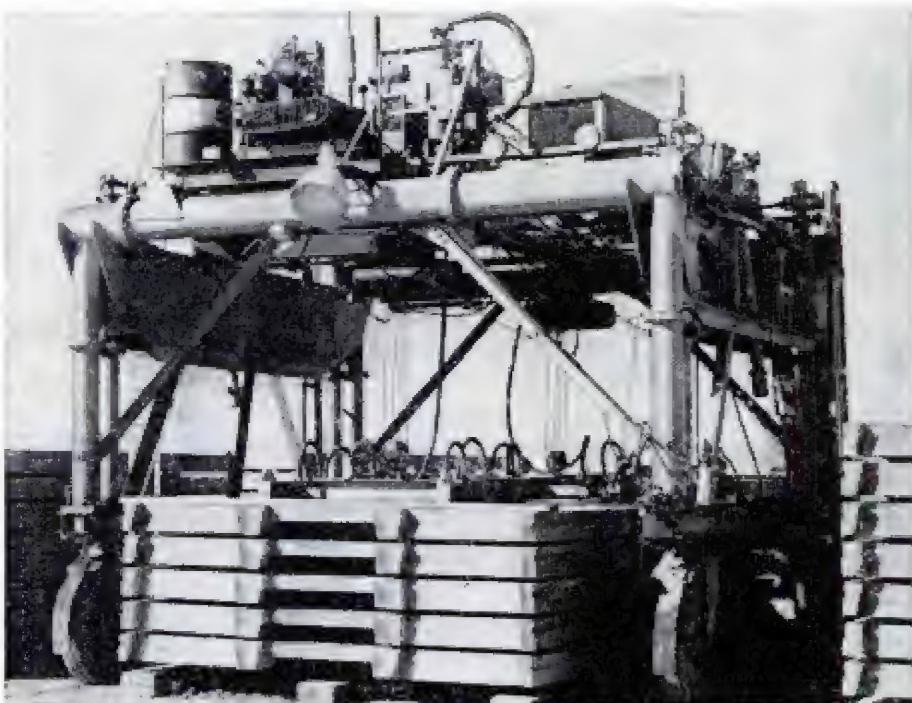


Converted lumber carrier gently lowers a partially cured concrete section into position on stock pile

Lumber Carrier Hauls Concrete

Straddling a pile of massive concrete slabs, a converted lumber carrier at a California building project lowers two giant suction cups, gently raises a section and carries it away to the construction site. The machine, originally a standard lumber carrier, was broadened $9\frac{1}{2}$ feet to make its width $17\frac{1}{2}$ feet. Five feet were added to each of the four legs, raising the height to 20 feet. Drive chain and steering shafts were extended and the entire structure strengthened. Two three-ton hoists were installed, along with a hydraulic system to center the slab after it has been picked up. The vacuum lifting device consists of two mats ringed with sponge rubber and connected to a vacuum

Vacuum pump and equipment atop carrier connect by hose to suction hoists

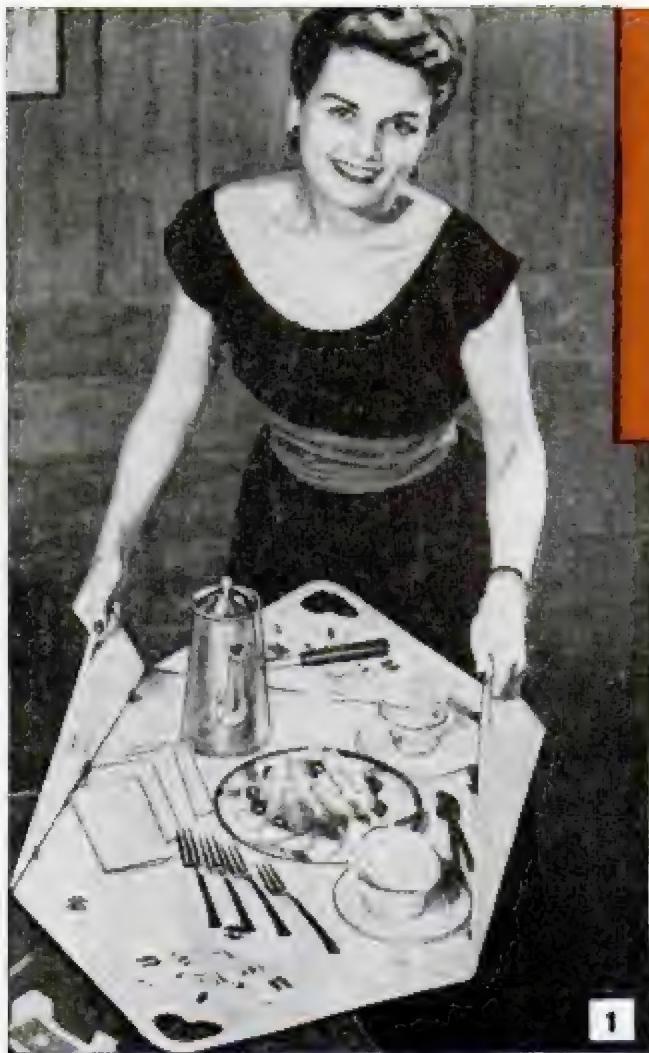


pump atop the machine. The eight-inch concrete slabs weigh only 100 pounds per square foot, but the vacuum is great enough to lift 14 times that load.



Calculator With Braille Symbols Aids Blind

Performing all the operations of a standard machine, a new calculator enables a blind operator to check figures as he enters them or to read the answers without help. Braille symbols on its three rows of numbered dials, exposed for finger-tip access, enable him to read results in any stage of the calculations. Totals may then be recorded on a Braille typewriter placed beside the calculator.



WHAT'S NEW FOR Your Home

© 1954 Popular Mechanics Co.

1. TABLE-TOP TRAY fits over a card table so that you can load it with food and setting—exactly as it will be used on the table—fold up the corners and carry the completely loaded unit by the cut-out handles. Of steel, it is finished with white enamel

2. MIXER for fruit-juice concentrates, powdered milk, beverages or batter also serves as a pitcher and a storage container, is easy to clean and does a quick job. Contents are agitated with a plunger. Made of plastic, it holds two quarts, is marked for measuring

3. DEODORIZER and insect killer plugs into any electric outlet, vaporizes insecticide pellets and deodorizing tablets. The nonstaining insecticide vapor settles in the room, leaving a residue said to be effective for 14 days. A bulb acts as a night light





4

4. BATHROOM SCALE folds into wall when not in use. Crossbar handle opens the door on its bottom hinges, causing the scale to come to rest on the floor with the handle serving as a sturdy support. Scale bottom is enameled to blend with wall tile

5. PLASTIC SHELF UNIT held together with a chromium rod mounts on the side of a kitchen cabinet to hold knickknacks or needed articles. Shelves are made with rounded corners, will not splinter or chip. Unit is designed for standard 30-inch cabinet

6. CABINET LAVATORY has drawers for towels and a roomy top to hold toilet and shaving articles. Sliding door on medicine cabinet makes it possible for cabinet to be twice as wide as swinging-door type and eliminates danger of hitting head on door

7. RECESSED HAMPER for soiled clothes contains two doors: The upper or smaller one is a lift door through which clothes are dropped into the hamper, the lower or larger one is swung out whenever hamper is emptied. Baked enamel covers the steel container



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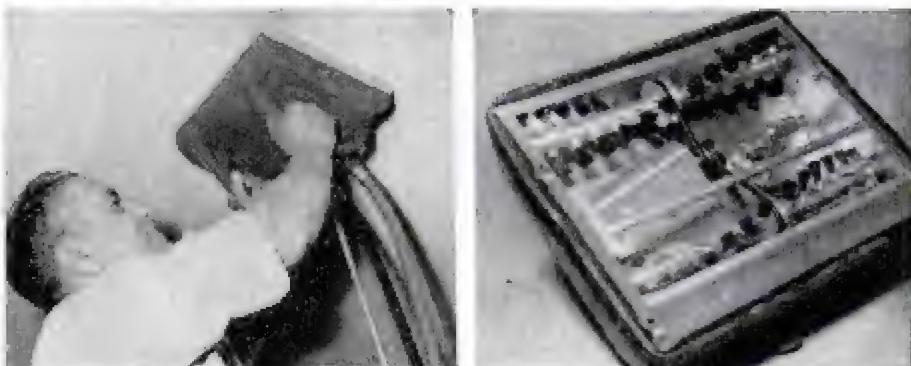
Quickly Mounted Corn Picker Has Twin Elevators



Twin elevators carry ear corn from picker to wagon in a new two-row cornpicker. The elevators have several speeds so that the corn can be tossed to the front, middle or rear of the wagon. The tractor operator has complete control of the picker from his seat. To mount the picker on his tractor, he simply drives the tractor into the U-shaped framework and attaches the machine by use of hydraulic controls, without leaving his seat. Dismounting is equally simple, so that the farmer can move from job to job.

Mechanical Wall Washer Scrubs With Soap and Running Water

Ernest Flores, a professional wall washer, never stopped wishing for an easier way to perform his tasks. He'd been watching housewives clean their floors with vacuum sweepers all his wife. Why not adapt the same principle to washing walls? He did, except that his device as yet employs no vacuum. The six-pound washer resembles a vacuum sweeper, even in size, but without the handle or dirt bag. It has two easy-to-grasp handles on top, one with a thumb lever to control the flow of water. On the side where the right middle finger can reach it is a button which activates a tiny pump for detergent



solution. Inside, two brushes rotate toward each other while water is sprayed from a punctured pipe between. A rubber bushing around the bottom of the machine prevents leakage of water down the wall. One hose connection admits water and another drains it away. An electric cable supplies power to the half-horsepower motor.

Truck-Mounted Suction Cleaner Scours Streetcar Tracks



Streetcar tracks in Germany are cleaned regularly by a motor truck that uses water pressure and suction for the job. The cleaning unit is mounted beneath the truck body, which is the repository for the dirt and holds up to five tons. Signal lights in the cab show the driver when the cleaning unit is correctly positioned on the rails. Flanged wheels guide the cleaning unit.

We Drive a Foreign Car

By Herndon Hudson

IT WAS A JULY morning in London, England, when we first took possession of our little red-upholstered black English sedan. Just over a year later, the car completed its first 10,000 miles. The place was Athens, Ohio, U.S.A.

We were ready to make an appraisal of our first year's experiences based on a careful accounting of expenses. This article is a report on a year with a foreign car—in our case a Hillman Minx.

We bought our Hillman by depositing a check for \$1645 in New York City. The car was



Photos courtesy Schmidt Motor Sales, Chicago

Although unmistakably foreign, the 1953 Hillman Minx is close enough to modern American styling so it doesn't look eccentric

Small cars are very maneuverable. Hillman's 33-foot turn-circle diameter enables it to swing around easily in this intersection



delivered to us in London and the price included subsequent shipment to the United States, clearance, customs and United States federal taxes. Actually, we got most of the customs charge of \$100 refunded later because we had not used all of our personal exemptions. British licensing, number plates and compulsory insurance (all for three months) cost a total of \$57. All these details were arranged by the company.

We selected the Minx because its styling corresponds most closely to that of current American models. Some of the other European cars are too narrow for their height, have "old fashioned" mountings for spare tires or unusual silhouettes. We didn't mind driving a smaller car, but we didn't want one that looked peculiar.

Since traffic keeps to the left in Britain, domestic cars have the steering wheel on the right. Export cars (and ours was one of these) have the wheel on the left. The dash arrangement was not shifted with the wheel so the speedometer is far to the right, the gasoline and temperature dials are in an awkward position and the bottom of the speedometer needle overlies the odometer at cruising speeds. That portion of the instrument panel nearest the driver contains a metal plaque illustrating how to shift gears. The car has four forward speeds and one reverse speed. The shift-lever movements are opposite to those in American cars. All this, however, is less complicated than it sounds and in a few hours shifting is done without thinking.

The front windows do not turn completely down and you can't rest your arm on the sill comfortably. One misses the armrest on the left front door. The electric windshield wipers have only one speed and the trunk lid only one support [1953 models have two supports—Ed.]. In heavy rain,

water drips into the glove compartment and onto the floor and the trunk is neither waterproof nor dustproof. The bumpers are light by American standards, but the slip-proof, built-in socket for the jack is convenient and safe.

The Minx presents difficulties for tall or stout persons, especially in the rear seat. The legroom is limited and the rear doors are narrow and do not open fully. We found that we could carry six persons on occasion, but the capacity is really four persons and, on the whole, the car is most suitable for two, using the rear seat for baggage.

Gasoline (or petrol) in Britain cost us 42.5 cents for the equivalent of a United States gallon. For the 4000 miles we traveled there, we averaged more than 26 miles per gallon (United States). For approximately 6000 miles in this country we averaged 23½ miles per gallon. On long trips the Minx goes 31 miles to the gallon. On a 1074-mile trip in April, we used \$9.56 worth of gasoline (35 gallons). In July, a 1445-mile trip cost \$12.52 in fuel (46.5 gallons). As the tank holds 8.5 gallons, one must refill about every 250 miles. The mileage figure for driving around town is, quite naturally, not so good. In the winter when the car is being driven only between the home and office, the mileage falls below 20 miles per gallon. The fact that the engine has to be choked considerably in cold weather increases gas consumption.

On the curving roads of Britain the small size and low power of most British cars keep average speed well below that in the United States. Some of our friends predicted that we would be thrown all over the road at American speeds in such a small, light car. However, we find that the weight (2075 pounds) and the height (60 inches) combine to produce a firm, steady feeling that makes even long trips not at

Small cars are easy to park. The Hillman has room to spare in a space that would be tight for a large car





Safe and slipproof is the Minx jack. The arm on the jack slips into a socket welded just under the bumper

all tiring. Cruising speed is around 50 miles per hour, though one may approach 60 or more without strain. The small four-cylinder engine has a narrow power margin and requires frequent gear shifting. Its 42-horsepower engine cannot be expected to produce very fast acceleration. In passing and on hills, one has to avoid demanding too much of the fuel pump.

Of the four forward speeds, high is vir-

Shifting is unlike the U.S. system. Lever here is in reverse. Note the speedometer location at far right



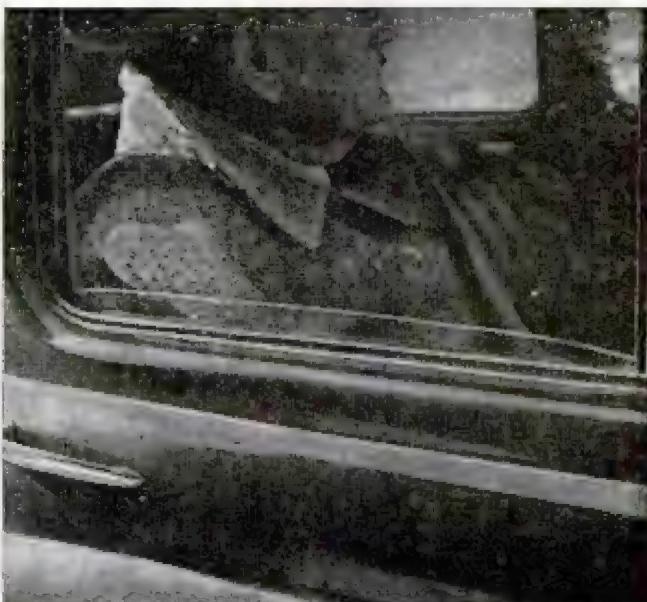
Getting in and out of the rear seat takes practice. The door opening is small and the wheel interferes

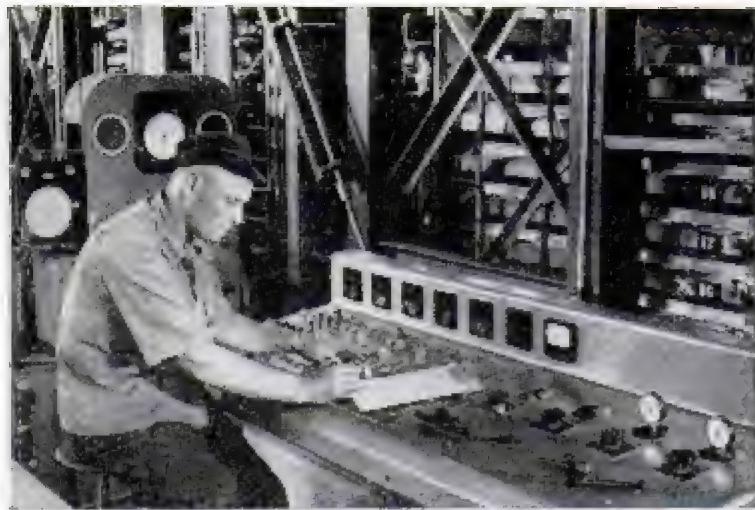
tually overdrive and is most satisfactory for level cruising. On a hill, one must shift promptly to third. This gear is also useful for braking on steep descents. Second gear corresponds to our low. First gear is an emergency low, used in difficult terrain or when starting on a sharp incline.

The easy steering (no power booster needed!), the quick, sure deceleration, the

(Continued to page 258)

Window glass in front doors won't go all the way down and sill can't be used as a comfortable armrest





High strength and flexibility are features of hardboard. Right, one of two control boards on production line

Automatic Plant Turns Wood Scraps Into Hardboard

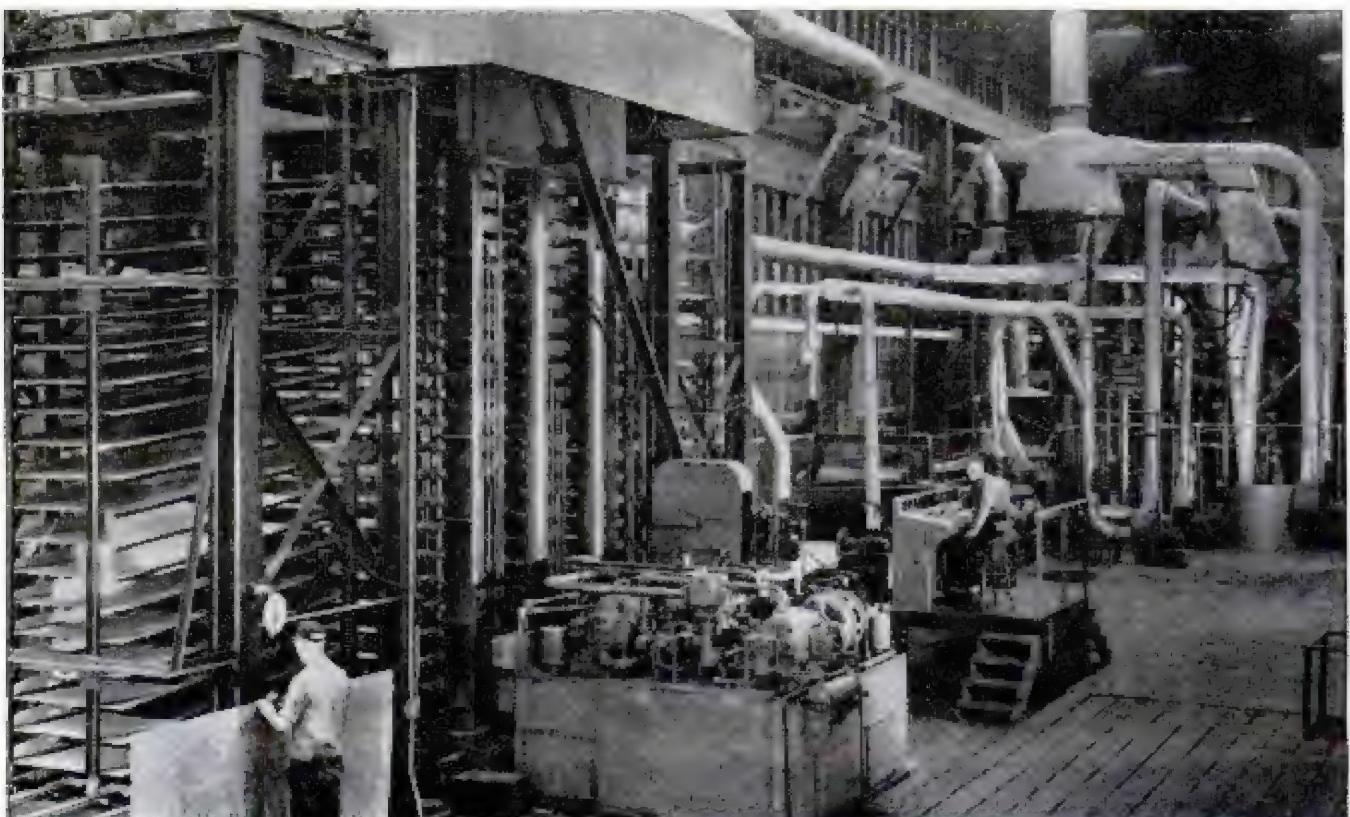
PUSH BUTTONS control operations at a million-dollar plant in Anacortes, Wash., which produces strong hardboard panels from plywood scrap. Only 30 men are required to turn out 2,500,000 square feet of board per month.

The waste material—log centers which remain after the veneer is peeled off, and solid old-growth Douglas fir—is first chopped into thumbnail size. These chips, softened by steam, are mechanically ground into tiny fiber bundles with brushed-out ends. Resins and other additives blend with the fibers as the material moves along a belt. The deep, spongy mass is hot pressed to form panels which are cut to desired size. About the only work done by

the operators—besides pushing buttons—is to feed the raw material into the machine, unload the trimmed pieces and grade the finished stock.

The resulting hardboard consists of thousands of microscopic, interlocking tresses that give the board elasticity and a high degree of shock resistance. In fact, the manufactured wood is so flexible that a strip of board $\frac{1}{8}$ -inch thick can be bent into a circle the size of a hatband without cracking. The hardboard, available in $\frac{1}{8}$, $\frac{3}{16}$ and $\frac{1}{4}$ -inch thicknesses, is light tan in color with a hard, satiny surface that takes paint well. The wood can be used for crates, display fixtures, underflooring, wall paneling and in cabinetwork.

Chips are softened in cooker section, right, before entering hot press, left. Few workers are needed in process





Valise-Size Motor Scooter Parks in Home or Office

Parking is no problem when you own a collapsible French motor scooter that you can take into your kitchen or office. It's called a Valmobile because it's valise-size.

On the road, the vehicle looks like any other scooter. When you stop, you simply fold the steering wheel and front wheel inside the body and pull the scooter indoors.

Mechanical Hospital Bed Serves Patient at Touch of Button

Built-in plumbing is a main feature of a mechanical hospital bed controlled from an instrument panel mounted on the bed tray. A touch of a button slides out a lavatory complete with hot and cold running water and drain. Another button brings a toilet beside the bed. Other buttons control head and knee lifts, a retractable trapeze with

reading light, elevation of the bed from 23 to 32 inches, tilting or vibration of the bed. The bed's movements are hydraulically actuated. A one-half-horsepower motor runs the hydraulic mechanism. The time required for care of the patient is reduced as much as 46 percent by the bed. Greater comfort and self-sufficiency result.



Introducing—JANE and DON ENGELHARD



a typical newly married American couple who are looking into the future with dreams of a home of their own. *Popular Mechanics* editors invited them to Chicago for conferences on their housing problem after

THEY WROTE US THIS LETTER:

Beloit, Wis

The Editor
Popular Mechanics Magazine
200 East Ontario St.
Chicago 11, Ill.

Dear Sir:

We are a young married couple, and one of the biggest interests in our lives is getting a home of our own. But how do we go about it? Should we build a new home, buy one already built, or fix up an old one? Of course, the state of our finances when we get ready to acquire a home is going to dictate much of the decision.

But like every other young couple, I guess, we like to plan and look ahead into the future. Right now we would like to start learning the things we need to know about homes. If we build, what is the best way to go about it — go to an architect, contractor, or both? What should we know about construction — just to make sure that we are getting a good house whether we build or buy it? We don't even know how to read a blueprint.

We would appreciate all the help you might give us.

Donald and Jane Engelhard

THE ANSWERS TO THEIR QUESTIONS—AND WE HOPE THOSE OF THOUSANDS OF OTHER COUPLES—ARE PRESENTED ON THE FOLLOWING 48 PAGES...

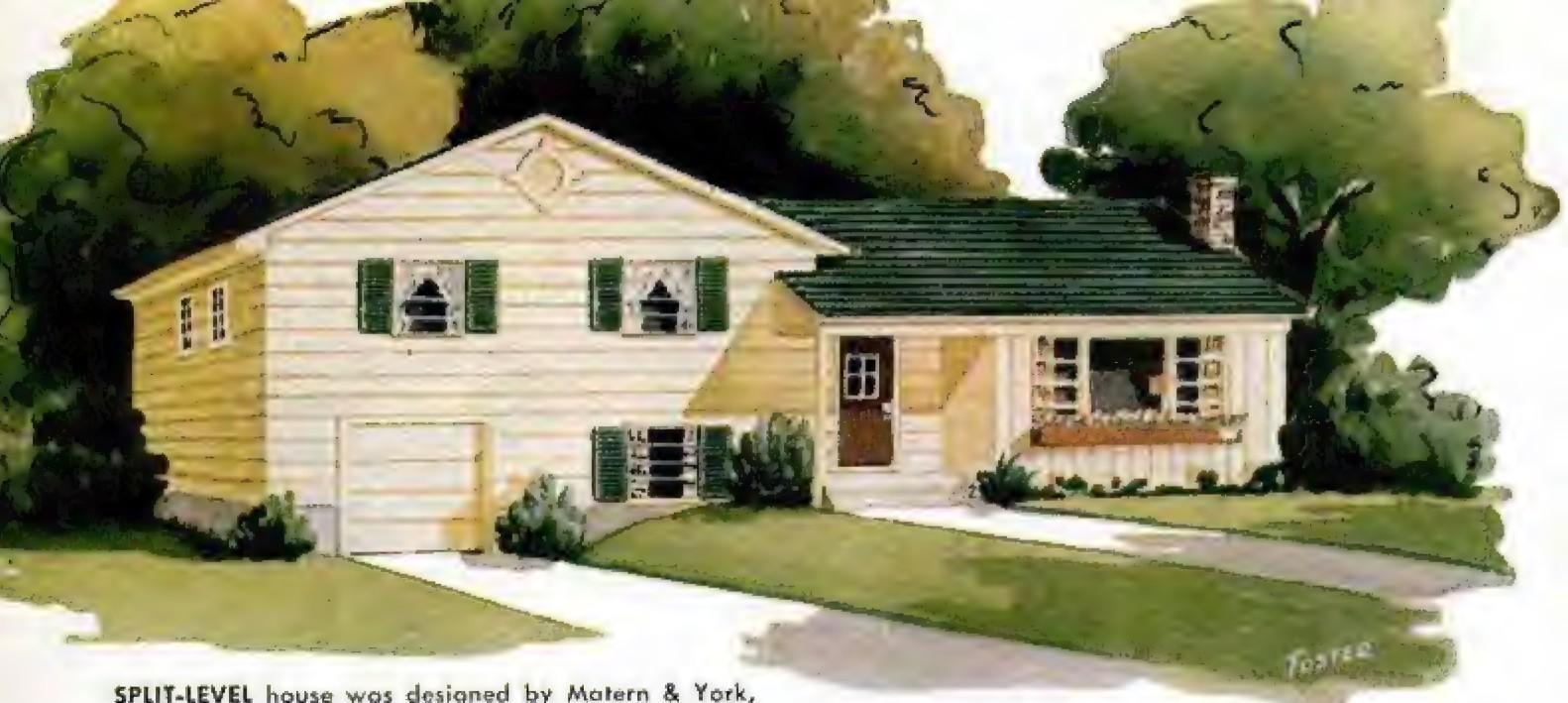


Jane and Don Engelhard ponder the problems of all prospective home builders: How much can we afford to pay? Two bedrooms or three? Basement or none? Carport or garage? And should it be traditional or modern type

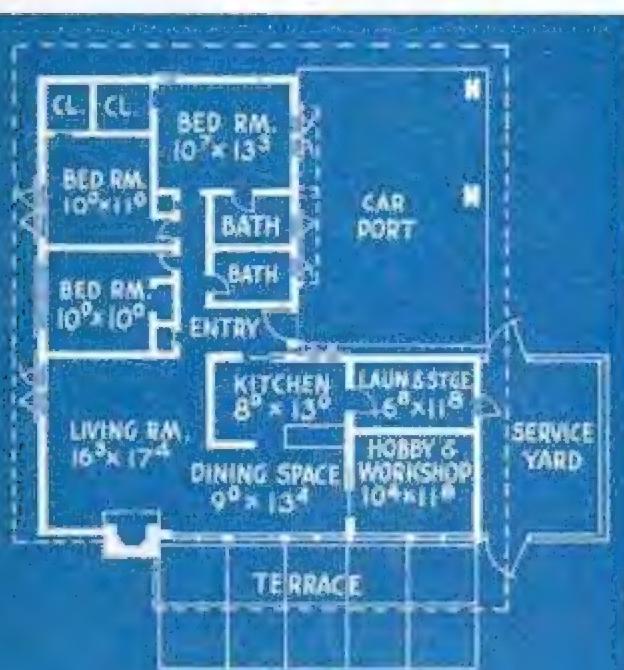
Tomorrow's Trend in Homes

PICTURED on this page and in more detail (including floor plans) on the following color pages are six modern homes of various types chosen from the million-odd new homes being built in the United States this year. Each was selected by the editors of *Popular Mechanics* for its outstanding livability, economy and general excellence in both interior and exterior planning. These houses range in price from \$7245 (including the lot) to \$19,800 (not in-

cluding lot). Building costs vary across the country and the prices listed represent the costs in the particular areas where the homes have been built. The exterior designs include the popular split-level, the contemporary flat-top, a modern adaptation of a Cape Cod house, an attractive California house with floor-to-ceiling glass walls, an inexpensive concrete-block house and modifications of the so-called ranch-type dwelling. ★ ★ ★



SPLIT-LEVEL house was designed by Matern & York, Jamaica, L. I., N. Y., and built by Viceroy Homes Inc., at Westbury, L. I., N. Y. Price, including landscaped lot 75 by 100 feet, is \$18,490. House has a full cellar with poured-concrete foundation. The exterior is wood siding. The floor area is 1234 square feet for the house and 243 for the recreation room

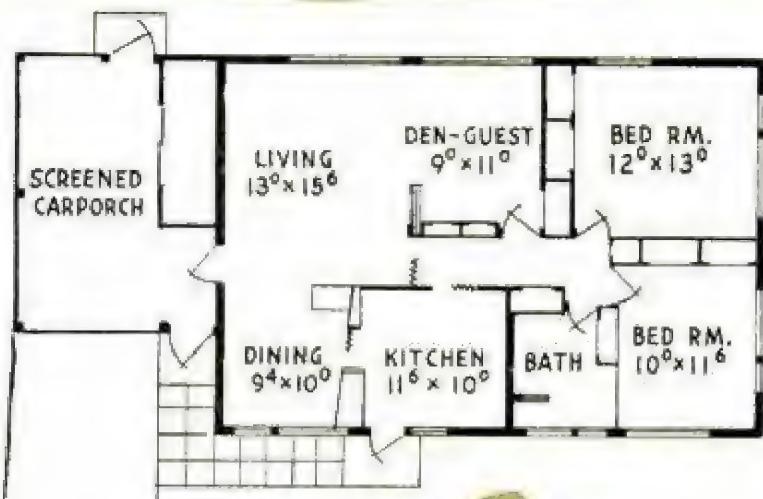
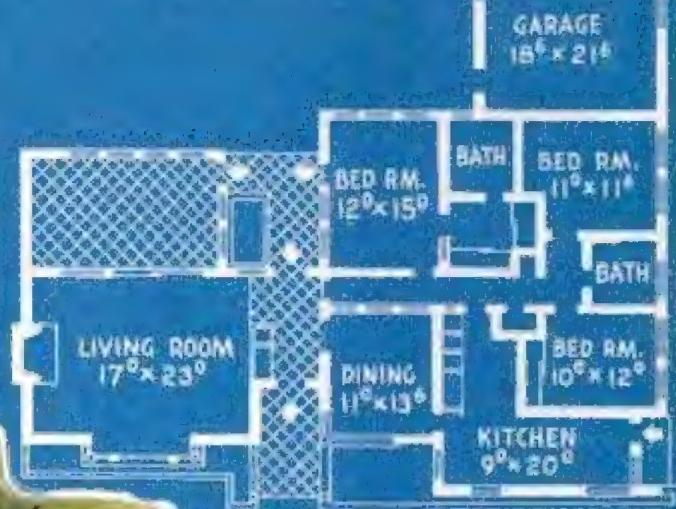


CALIFORNIA house planned for outdoor living, designed by Anshen & Allen, San Francisco, and built by Eichler Homes, Palo Alto, at Redwood City, Calif. The price, including lot, is \$17,750. Construction is standard stud wall with exterior sheathing of ship-lap redwood siding. Floors in living areas and hallways are cork; kitchen has stainless-steel sink (with garbage-disposal unit) and hardwood cabinets; price includes electric range; Philippine mahogany paneling throughout. The floor area is 1425 square feet

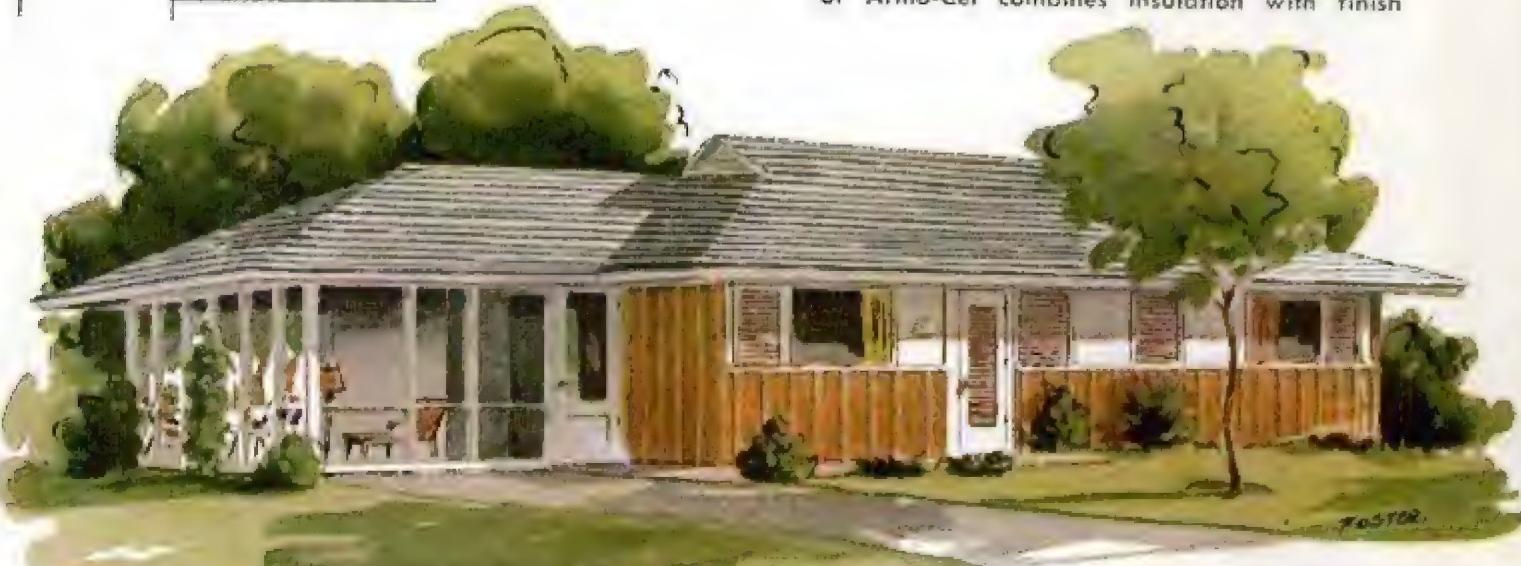


TRADITIONAL house with modern touches, especially the interior planning, was designed by James Ronald Fetridge and built by George D. Buccola (owner acting as his own contractor) both of South Pasadena, Calif. The cost was \$19,800, not including the lot. Exterior construction includes vertical redwood siding and brick. House has a shake roof, steel sash, hardwood floors in living area (tile in kitchen and baths and in smallest bedroom used as den), plaster walls. Tiled passage with doors at either end separates living room from rest of house. The terrace, or lanai, is partially enclosed with walls and is at rear. Total floor area is 2070 square feet.

Section

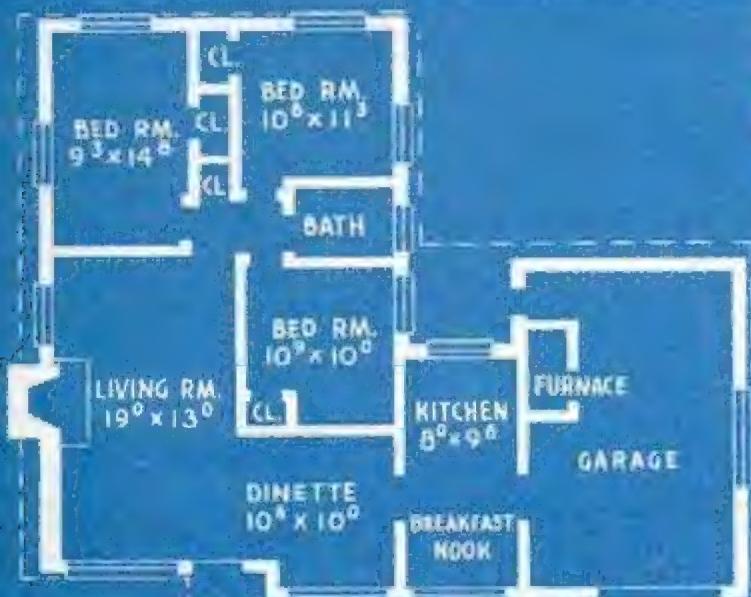


ECONOMY ranch-type house was designed and built by Martin L. Bartling, Jr., of Knoxville, Tenn. The price (\$11,740) includes a lot 100 by 150 feet landscaped and with black-top driveway. Floor area is 1000 square feet. House is frame with exterior plywood covered with batten strips. Roof construction is trussed and all interior partitions are storage walls. If third bedroom or den is not needed, wall can be shifted to enlarge living room. Screens at front of porch are a door which swings out to convert it into a carport. House is built on concrete slab foundation and is fully insulated. Heating is electric radiant Cell Heat embedded between two layers of sheet rock in ceiling. Roofing of Armo-Cel combines insulation with finish

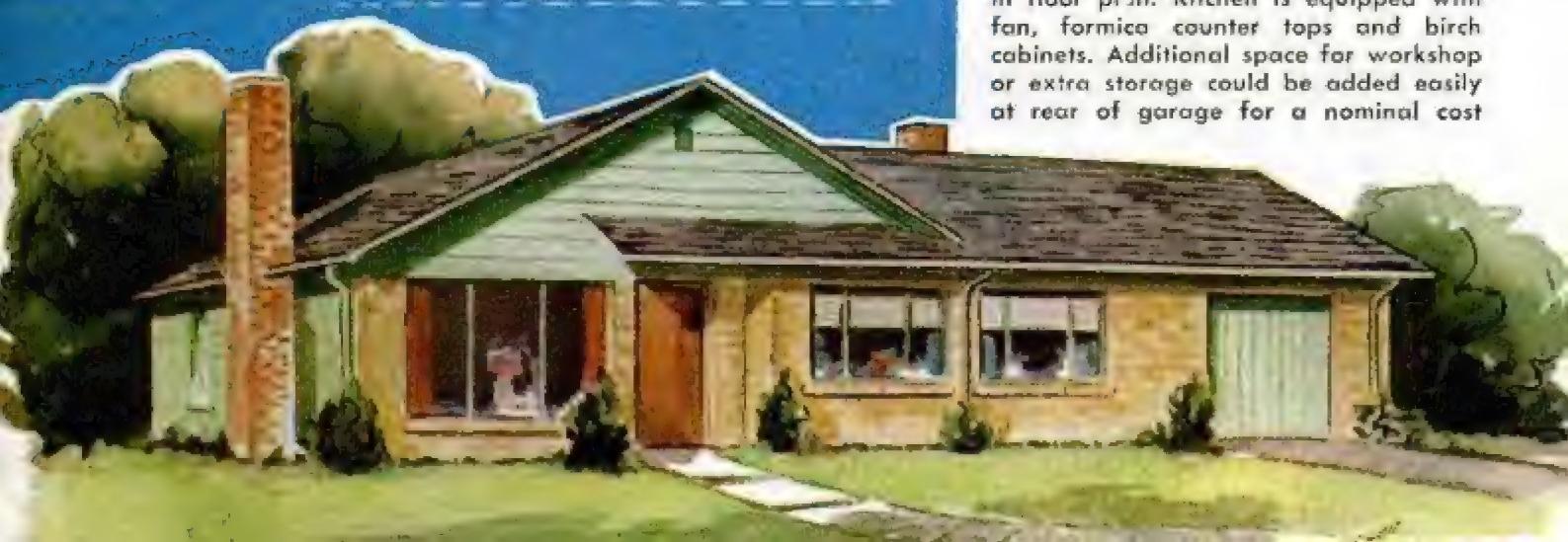




FLAT-TOP MODERN house has price tag of only \$7245, including the lot, and was designed and built by Earl W. Smith of El Cerrito, Calif. The floor area is 900 square feet; wall construction is standard frame; ceiling is two-inch plank and beam with $\frac{1}{2}$ -inch insulating board and covered with a built-up gravel roof. Steel sashes and copper plumbing are used throughout. Floors are finished with asphalt tile. Bedrooms have sliding floor-to-ceiling wardrobe doors. Storage closet at rear of carport measures 4 feet by 10 feet 6 inches. This is one of the most popular contemporary homes being built on West Coast



CONCRETE BLOCK house was built by Albert Balch, Seattle, and was designed for the Balch enterprises by Ken Burlingame. The price (without lot) is \$12,500. Square footage totals 1338 (including 321 for the garage). Concrete slab floor is poured over copper tubing for radiant heat. All windows are oversize with steel sash; roof is cedar shake and doors are of mahogany. Roman brick of fireplace wall extends from hearth to front wall of the house as can be seen in floor plan. Kitchen is equipped with fan, formica counter tops and birch cabinets. Additional space for workshop or extra storage could be added easily at rear of garage for a nominal cost.



**To Jane and Don and millions
of other couples interested
in buying or building a home
—here are valuable tips from
a noted architect on some of
the 1001 things to bear in
mind . . .**



When You Plan That House

By Rudard A. Jones, A.I.A.

Assistant Director, University of Illinois Small Homes Council

IT'S FUN to plan a house. Just take a look at your way of living—that's the starting point. Keep in the back of your mind, though, the thought that your new home will be one of your major investments—not only in money, but also in future living satisfaction.

Informality keynotes our way of life today, with emphasis on comfort and convenience. Ostentatiousness is out. Our goal is to plan a house that we can run, rather than a house that runs us. Since we seldom have servants, we must give careful thought to planning features that will mean convenient use of the house. Every step saved

means time saved, time we can use to relax and enjoy our surroundings.

To get the most and best space for your money, study your requirements carefully. A thorough analysis of your needs can aid your architect immeasurably in planning a perfect home for you. This means deciding not only the number of bedrooms and other rooms you would like, but including in your study the influences of modern machines and materials. For instance, the constant use of the automobile means your "front door" will most likely be the entrance closest to the garage and to parking space for visitors. Your television set may

**Split-level house designed by the author
uses windows for indoor-outdoor effect**





Architect Jones incorporated many of his ideas in this contemporary house. This photo was taken from the position of arrow No. 1 shown on floor plan on opposite page. Overhangs at front and rear help control sun

be the focal point in your living and dining areas. Remember that better heating makes rooms 100 percent usable with no wasted space. Air conditioning gives freedom in window placement, thus keeping windows strictly for light and view. New materials permit imaginative details you may like to include; for example, double glass makes large glass areas practical even in northern climates. You will want to study carefully the area for your laundry work so you can make the best use of modern laundry equipment.

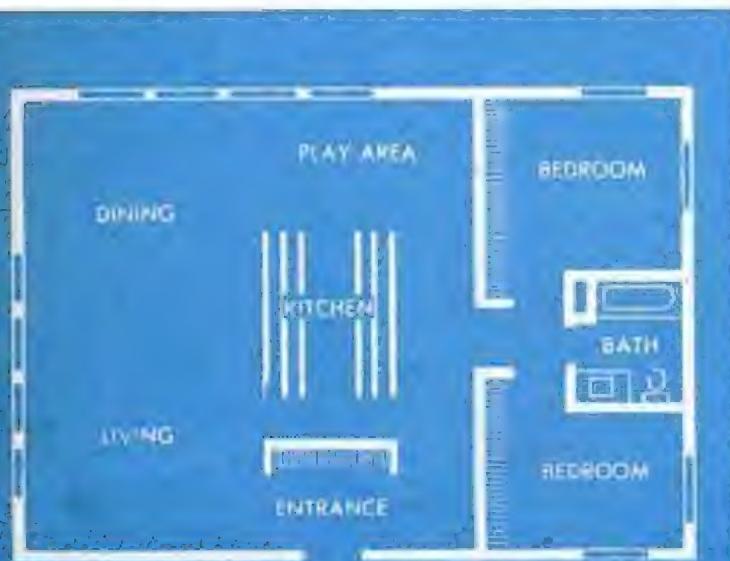
Site. Before you are ready to start thinking about your new house in detail, you must make several basic decisions. First is the selection of the building site. Check these facilities: Sewage disposal, water supply, electricity, gas, streets and side-

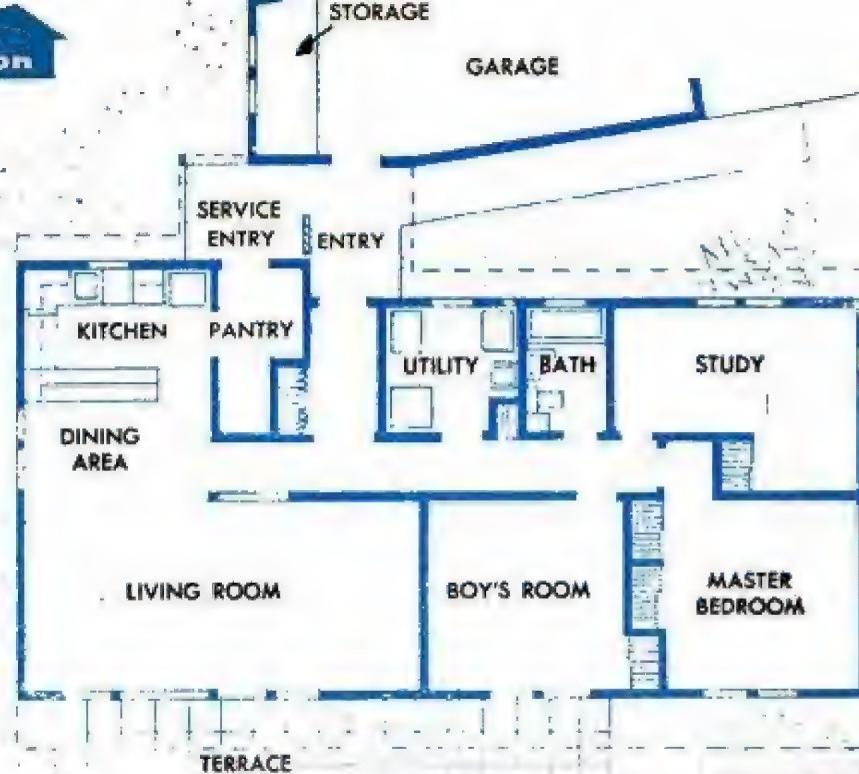
Jones is a strong advocate of the open-type plan with only full height walls around bedrooms, bath

walks. Can the land be drained properly? Is there adequate fire and police protection? What about zoning? There may be special features—an exceptional view, a fine grove of trees, and so forth. A small site may require a multistory structure; a good view may change your plan entirely. The site directly influences the house.

Basement or No Basement. In the first stages of planning you will have to decide whether or not you are to have a basement. A light, dry basement provides an excellent spot for storage, heating system, laundry, workshop, hobby and recreation areas. In addition, basement space is much less costly than space on the first floor.

The disadvantages of the basement, however, may outweigh its advantages. On some sites it is difficult to prevent basement leakage economically. Condensation on walls or pipes may also be a problem in areas where summers are humid. Sometimes it is difficult to get satisfactory natural light in the basement. If the house is raised to expose the basement windows, the house appears awkward and too high. Grading may be done to improve the appearance of the house from the street but, in general, this will reduce the low-to-the-ground look that is considered desirable. In addition, there is often much stair climbing involved in using a basement. Finally, you may find that in spite of the low cost per square foot, the total cost of a full basement is too much considering the amount the basement is actually used. In these cases it may be possible to provide only a partial basement. The split-level





(PHOTO)

(PHOTO)

This home was designed for a family with one son. Study could be a third bedroom. Note service and main entry

house is one answer. If the basement is eliminated, additional space must be provided to compensate for it. [Editor's note: For further remarks on the subject of basements, see panel discussion, page 164.]

Number of Stories. Shall the house be a 1-story, a 1½-story, a 2-story, or shall it be a split-level house? You should examine the advantages and disadvantages of various types to see which suits best your way of living. Currently, the most popular house is the one-story. It is popular because there is no stair climbing, there is more freedom in arrangement of the plan and the house has the popular long, low look. This type often takes more hall space.

The 1½-story house is still popular in some areas especially in the north and east sections of the United States. It is compact and affords an opportunity for expansion. Dormers are required if cross ventilation is to be provided on the second floor; they are, however, expensive to build. The need for a bath on each floor often complicates the cost. It requires careful planning to arrange an expandable 1½-story house so that it is satisfactory both before and after the expansion.



Kitchen is separated by only partial partition from the dining area in keeping with open-type planning which makes any small house seem larger. Picture below was taken at position of arrow No. 2 on floor plan. Partition hides service entry to kitchen





Ronald Partridge photo for Eichler Homes

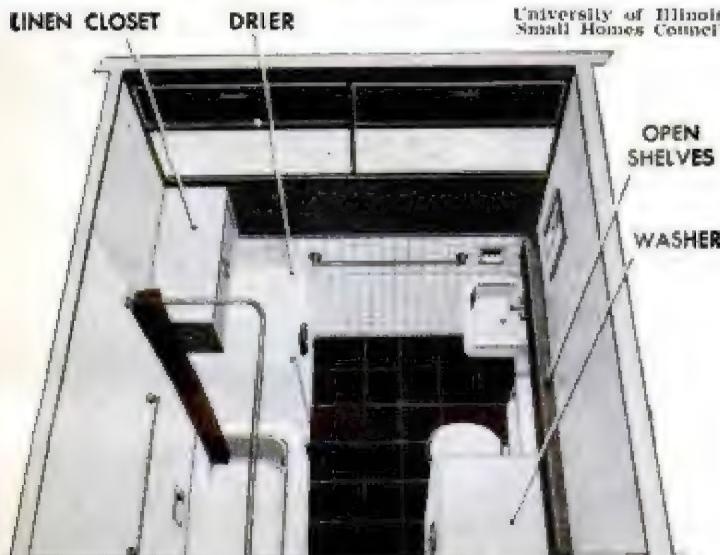
Contemporary home designed by Anshen & Allen uses glass walls in living room which opens onto rear terrace

Stair climbing is a problem in the 1½-story house.

The two-story house is dwindling in popularity although it is almost mandatory on smaller lots. The house is compact, and it probably has lower costs per square foot of livable area than any other house because there is less roof and less foundation. Here again, though, there is the problem of stair climbing and it is usually desirable to have two bathrooms.

The split-level house or trilevel house often proves an excellent compromise between one-story and multistory houses. In one type of split-level house, the living room, dining room, kitchen and front entrance are on the ground level. One half flight of stairs above this level is the bed-

Laundry-bath contains conventional bathroom equipment plus an automatic washer and electric drier



room-bathroom area. Below the bedroom area, and a half flight of steps lower than the ground floor, is the utility level. Here are the laundry facilities, the heating system, a workshop or playroom.

Advantages of the split-level scheme are several. The walls of the basement, or utility section, are actually about half out of the ground and, therefore, this level is well lighted and makes an excellent working area. Since this area is only about half of the house, the cost is not great. Stair climbing is not excessive as there are only six or seven steps between levels. Another advantage—the bedroom level is well isolated both from the street and the remainder of the house. Many believe the split-level house may be built only on sloping lots. This is not true, as the scheme is equally successful on flat ground.

Selecting the Rooms. Planning the house involves the pleasing arrangement of spaces to care conveniently for the various activities of the family. This involves the design and placement of rooms with consideration given to the activities to be carried on in these rooms. After you have made your basic decisions about the site and type of house you wish to build, you are ready to consider the rooms.

Living Room. A wide variety of activities, including daily living, reading, listening to the radio, watching television, child play, guest reception, entertainment and general recreation, takes place in the average living room. There is feeling on the part of many architects and homeowners that there

(Continued to page 262)



Monsanto Chemical Company
Storage walls in small homes save space by taking the place of furniture. These are fir plywood units



University of Illinois Small Homes Council
Closet wall with attractive grass screen for doors also saves space; sliding doors do the same thing

FIRST STEP IN HOME PLANNING—CHECK LIST FOR FAMILY NEEDS



HOUSEWORK

Food preparation

- Kitchen

Laundry

- Basement
- Utility room
- Kitchen-laundry combined

Sewing

- Utility room
- Kitchen-laundry combined
- Dining space
- Bedroom

Housecleaning

- Proper storage

Garden and yardwork

- Basement or utility workshop
- Garage or utility workshop

Maintenance (Tools, paints, etc.)

- Basement workshop
- Garage workshop

Domestic help

- Servant's room
- Lavatory or bath



Dining

- Dining room
- Part of living room
- Part of kitchen

Family leisure

- Living room
- Bedrooms
- Study or "quiet area"

Outdoor living-dining

- Porch or terrace
- Lawn

Recreation and entertaining

- Living-dining areas
- Kitchen
- Basement game room
- Utility-game room
- Terrace, porch or yard

Small children's activities

- Utility-playroom
- Living room
- Play-bedroom combined
- Terrace, porch or yard



FAMILY GROUP LIFE

Sleeping and dressing

- Bedroom or other area
- Clothes storage
- Bath

Hygiene

- Bath
- Lavatory

Individual work, hobbies

- Study or "quiet area"
- Bedrooms
- Basement workshop
- Utility room workshop
- Garage workshop

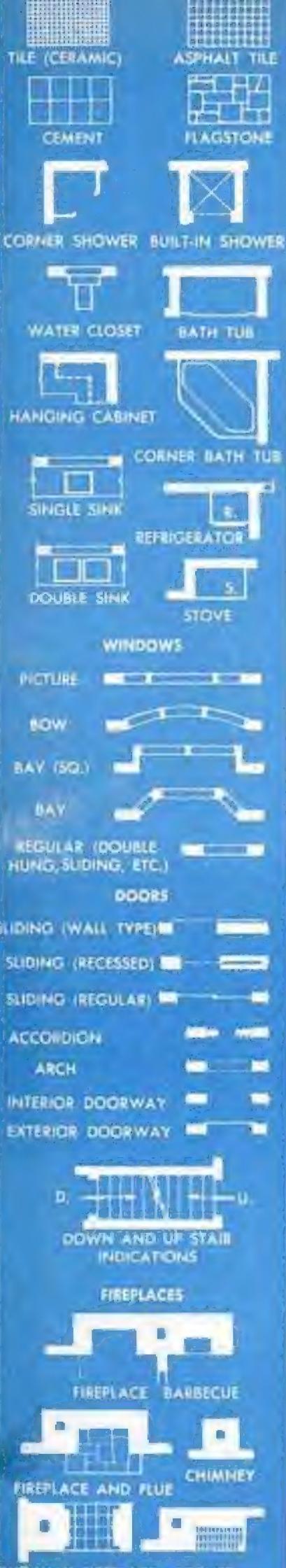
Isolation (infants or sick)

- Quiet bedroom

Guest accommodations

- Guest room, or
- Sleeping facilities in
 - Study
 - Living room
 - Utility room
- Convenient lavatory

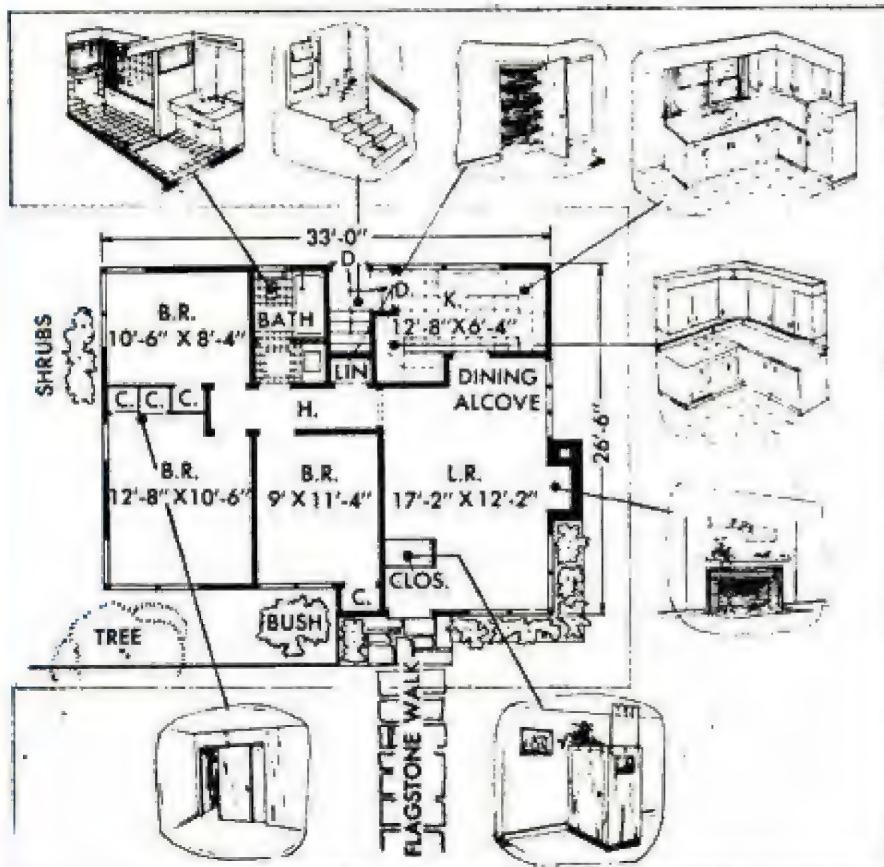
University of Illinois Small Homes Council



Don and Jane's troubles in reading a blueprint are no more, thanks to Rudolph A. Matern, noted architect, whose handiwork decorates this page. Learning basic symbols takes few minutes

How to Read a Blueprint

THE SYMBOLS and abbreviations on blueprints are a language in themselves—the trouble is that too few persons understand them. Once you learn what they mean, it takes only a little imagination to visualize a complete home from the floor plan. Doorways, windows, fireplace, closets, stairs, built-ins, the arrangements of kitchen and bathrooms come to life. Once the symbols are learned, the house should be imagined in third dimension (see sketches around floor plan below) just as if it had been sawed through horizontally. Another great advantage of understanding a blueprint is that it makes it possible for a prospective builder to plan his home more accurately.

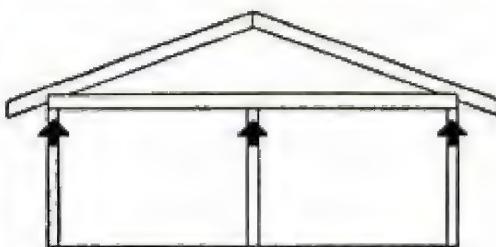


Tips on Good Construction Practices

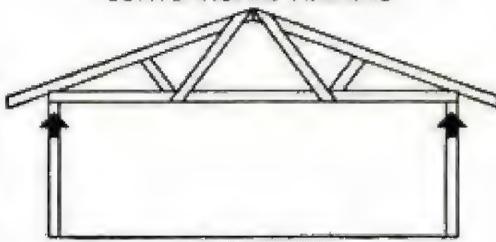


University of Illinois photo

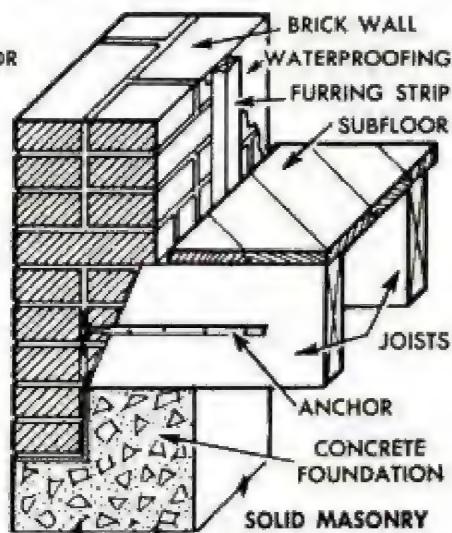
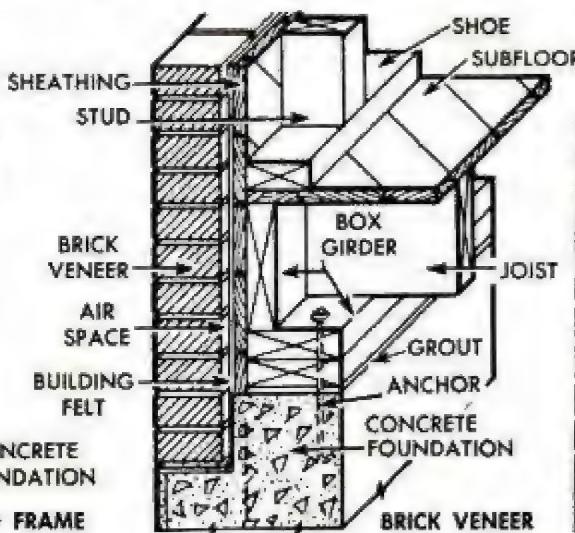
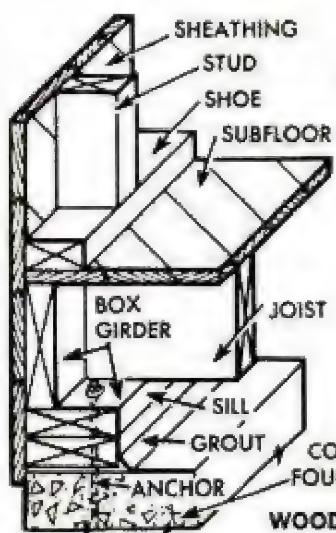
Precutting roof trusses on site saves many man-hours. The W-truss in sketch above permits weight of roof to be supported by exterior walls. Top sketch shows conventional roof with interior support. First used on one-story houses, the W-truss (photo above) is being tested for 1½-story homes at University of Illinois



CONVENTIONAL FRAMING

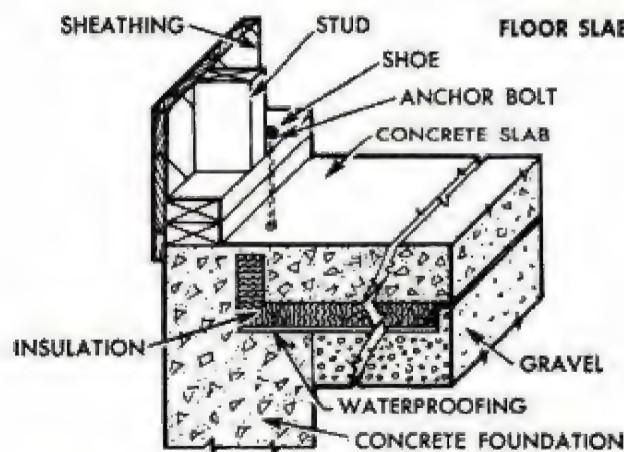


TRUSS ROOF



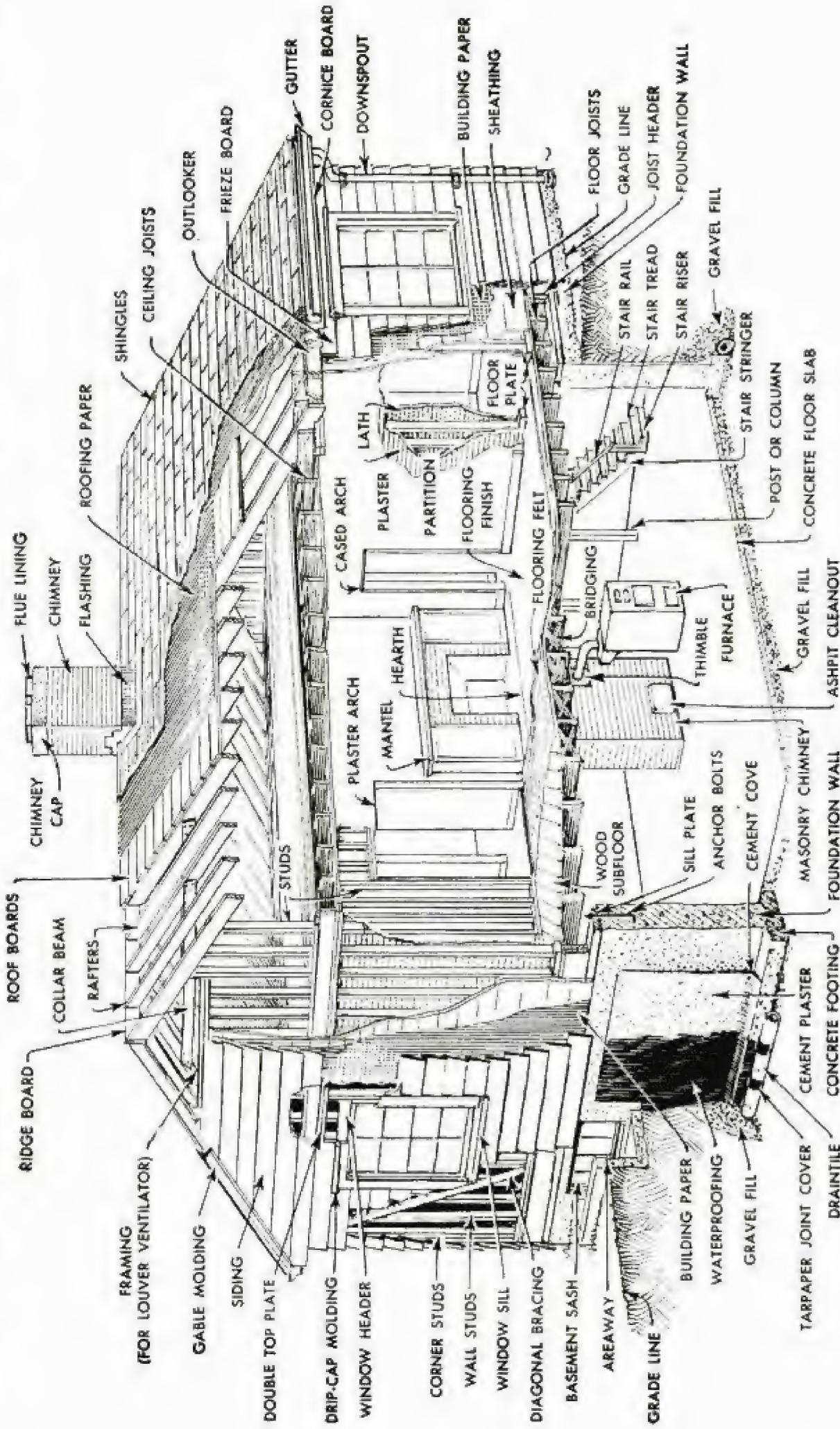
Approved practices for wood frame, solid masonry and brick veneer construction are shown left to right. These are the three basic types of construction used in home building and permit any desired architectural effect. The majority of U.S. homes are of frame construction consisting of vertical studs and sheathing.

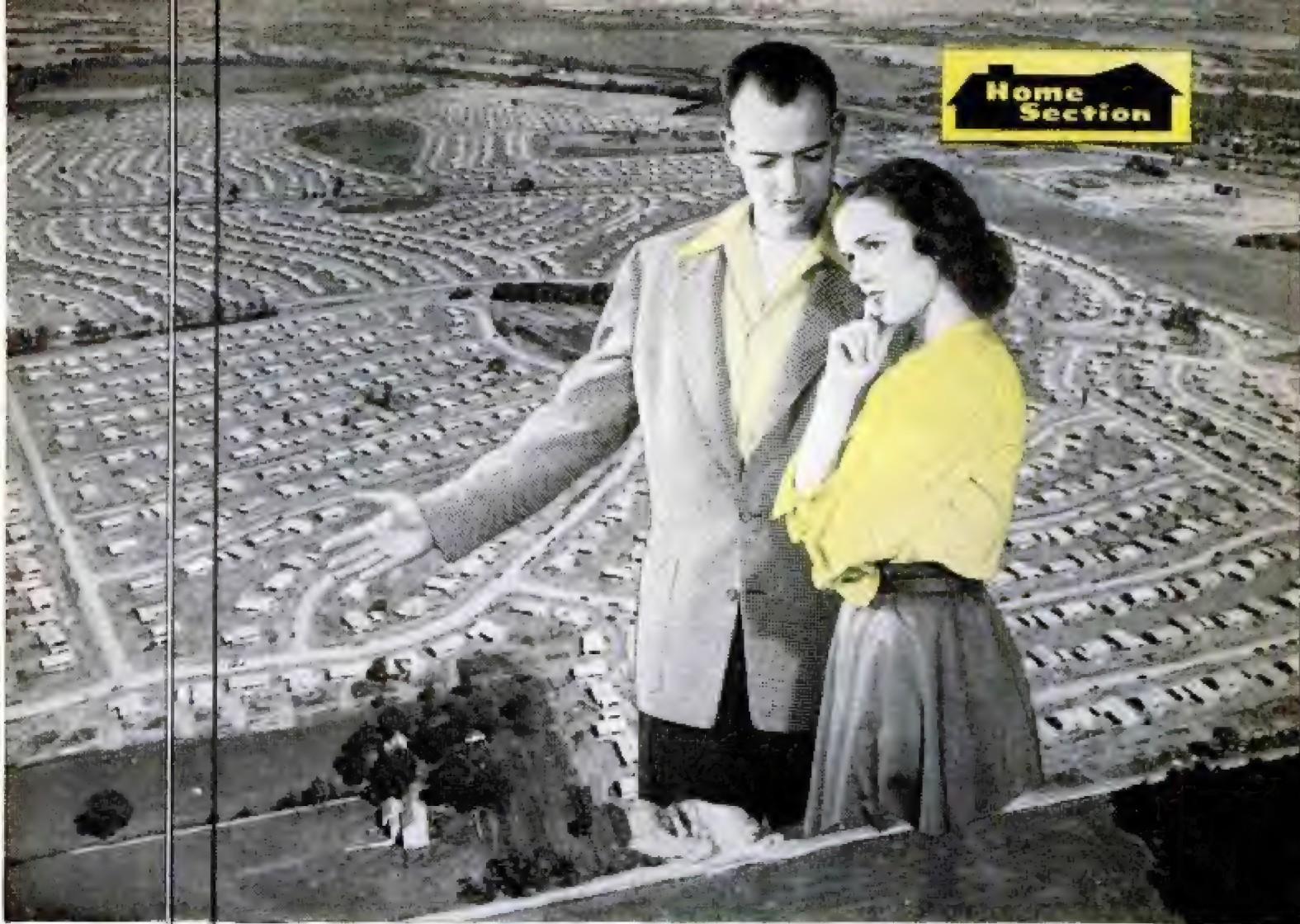
Right, tilt-up wall is tilted into position after it was assembled on floor where nailing is easier



Approved construction for concrete-floor slab uses waterproofing and insulation between slab and earth and also between the slab and the foundation wall. Slab foundation is used in the basementless house.

Here's Your "Dictionary" of Building Terms





With Levittown, Pa., in background, Don and Jane weigh advantages of mass-built home

Any reliable architect or builder will tell you that if the mass-produced house meets your needs you can get

More House for Less Money

By Richard F. Dempewolff

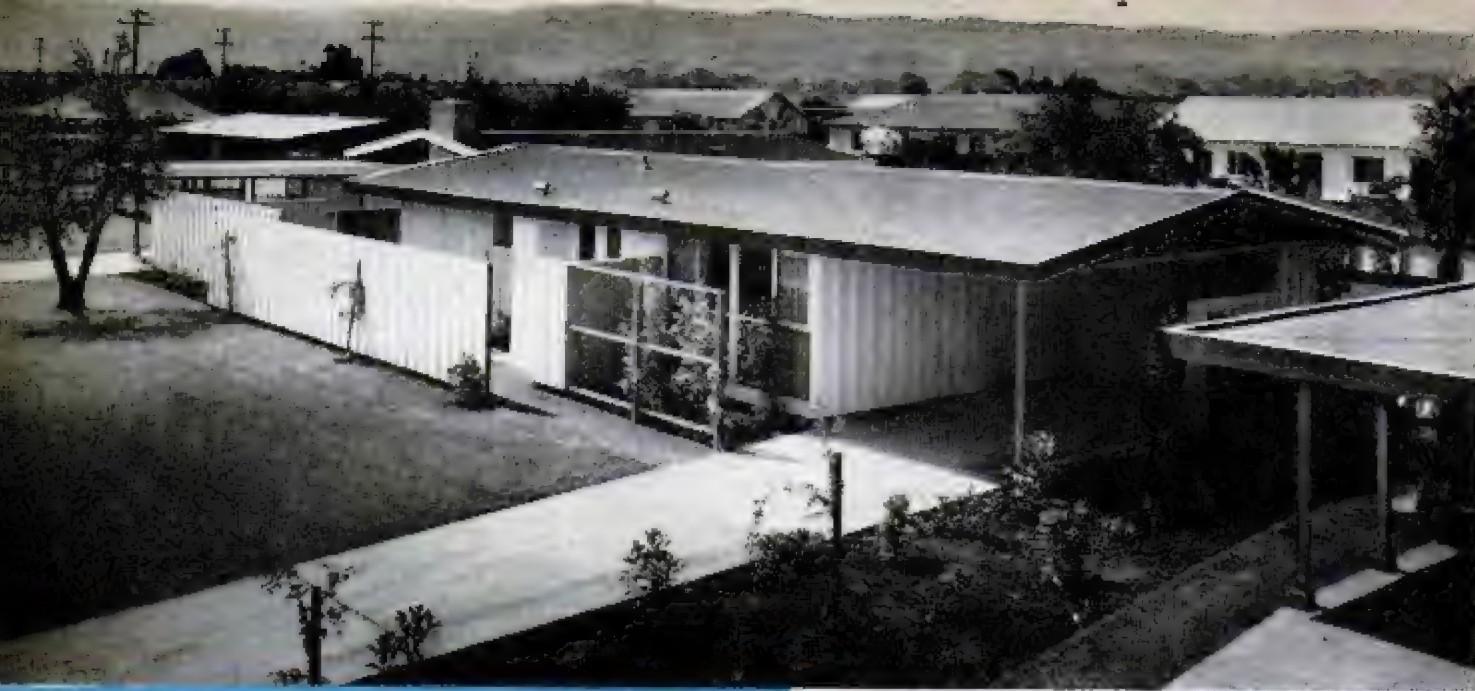
A PALL OF DUST hangs over southern Bucks County, Pa., these days. A roar of clanking machines resounds through the hills. Bulldozers are shoving the topography around to improve on nature's drainage over a $5\frac{1}{2}$ -square-mile chunk of countryside. Whirling shovels of mechanical ditch-diggers spin like Ferris wheels as trenches for an entire city's sewerage system snake out behind them. Convoys of trucks rumble by, each laden with precut lumber for whole houses. Here, a crew of men is pouring a network of concrete streets from the revolving drums of concrete-mixer trucks. Up the hill, a forest of framing for several hundred homes is taking shape. Beyond them, carpenters, ma-

sons, plumbers, electricians and painters are finishing another huge tract of houses.

"Once the groundwork is finished," says the man largely responsible for all this, "the houses go up boom, boom, boom."

He's not fooling. William Levitt, the Henry Ford of the housing business, along with his architect brother, Alfred, and their landscaper-lawyer father, Abraham, is building another city on a dizzying timetable that sees a home completed every 12 minutes when things are going toptilt.

Last year at this time, the site near U. S. Steel's new Fairless Works, a few miles south of Trenton, N. J., was sparsely settled rolling farmland. By next year, Levittown, Pa., will be a full blown city of 70,000



Valley Realty Company photo

Designed by Cliff May and Chris Choate this two-bedroom house (815 square feet) will sell for only \$7500



Living room of May-Cheate California house has floor-to-ceiling windows and doors that open onto terrace

people living in 16,000 modern homes containing about every convenience today's housewife can desire. Nine thousand dollars buys the two-bedroom Rancher with expansion attic, \$10,990 the three-bedroom Levittowner and \$17,990 gets the handsome Country-Clubber. Unlike the 17,450-house Levittown on Long Island, which sprouted from the potato fields in more or less haphazard subdivisions, the new Levittown is a completely planned modern city, designed from scratch. That price tag on his house also buys each purchaser his share



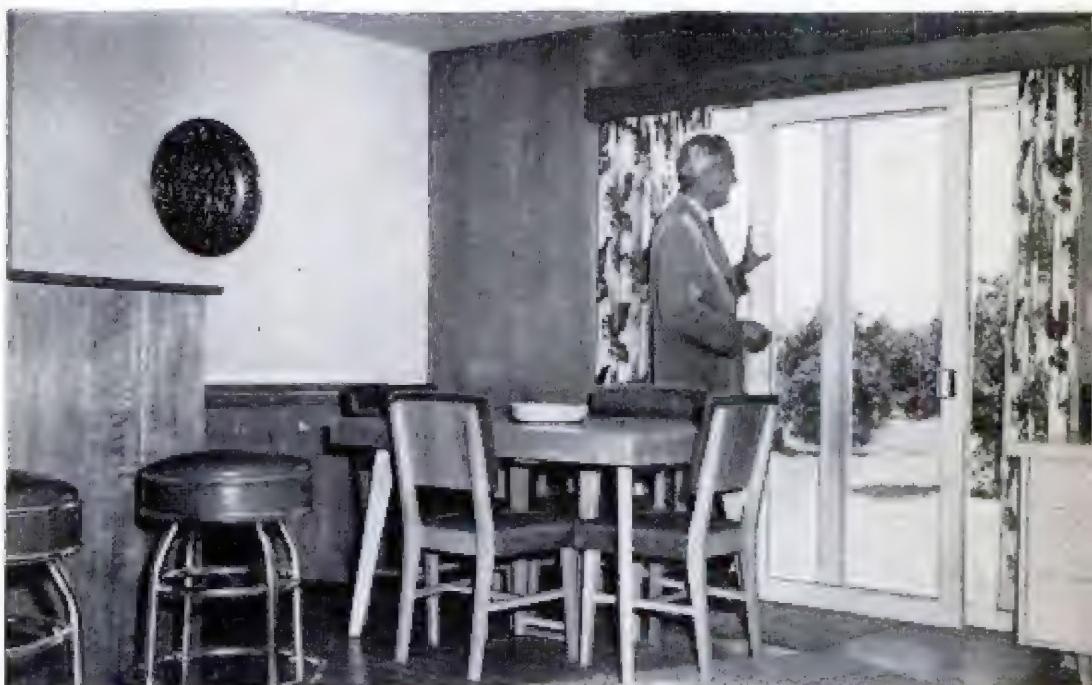
of eight olympic-size swimming pools and recreation areas, a \$300,000 community house, a 25-acre lake, a \$20,000,000 shopping center with covered walkways, vast parking areas, curbed concrete streets feeding off four-lane main arteries lined with aluminum street lamps—not to mention some half million newly planted shade, fruit and evergreen trees that grace not only individual plots with seeded lawns, but also landscaped public areas. Eight public schools and a brand new railroad station will round out the community's facilities.

When Levitt & Sons first began to turn out houses like so many automobiles back in 1947, they were pioneers with a new housing technique. Today, mass builders, using similar cost-cutting techniques have been cropping up as bountifully as the homes they produce. Money saved by putting up 5000 instead of 5 houses at a time is passed along to the buyer who, for less money than he would have to pay a private contractor for the same floor plan, gets himself a building of top-grade materials, fully equipped with a glittering array of modern conveniences.

More than 1000 Levitt-type homes have sprouted outside Philadelphia in new subdivisions. In Portland, Ore., Franklin T. White has copied Levitt's ranch-type house and erected miniature Levittowns at somewhat higher prices than Levitt gets. On a slope in San Francisco,



Luxury tract house built by David Bohannon near San Francisco sells for about \$25,000 and would cost much more if custom built. Fifty homes of this type were built as a mass project. Called the Pace Setter, this model won prize

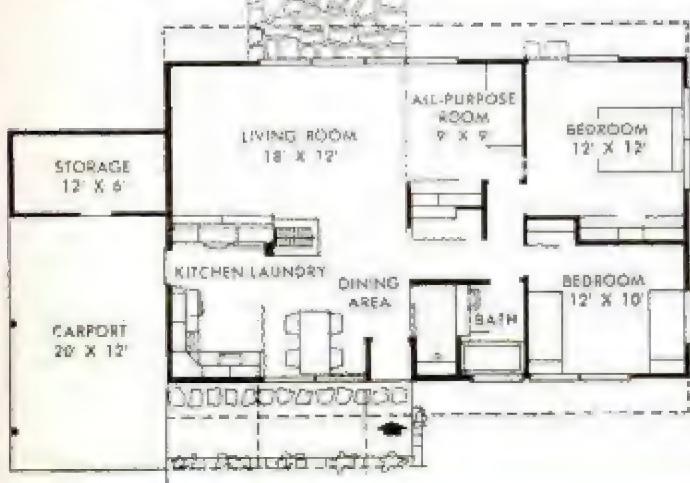


Dining area of tract house built by California builder Henry Cox has sliding glass doors that open to back yard patio. Snack bar, left, shuts off kitchen area. Below, Cox house with pleasing design and shake roof sells for \$16,000 but with optional extras such as radio-controlled garage doors goes to \$18,000





Most popular of Levitt's production homes is this three bedroom Levittowner which sells for \$10,990



a project builder named Henry Doelger has put up so many rows of white two-story, five-room houses on 25-foot lots that quipsters call his development "the white cliffs of Doelger."

Many of the new, well-planned communities are a bonanza for the man with a middling pocketbook and an instinct for comfortable living. David Bohannon's 8000-house tracts near San Francisco give prospective owners a choice of 24 basic one-story designs on 60-foot-wide lots. The houses feature wood paneling, tile baths, U-shaped flow areas and laundries, for prices ranging between \$8850 (for two bedrooms) and \$12,650 (for a large three-bedroom cedar-shingled ranch house).

Bigger yet are the "grid" rows of California's largest "housing city"—Lakewood. Here, on a 10-square-mile area near Los

Newest model offered by the Levitts is two-bedroom Rancher. Attic can be finished off for extra rooms

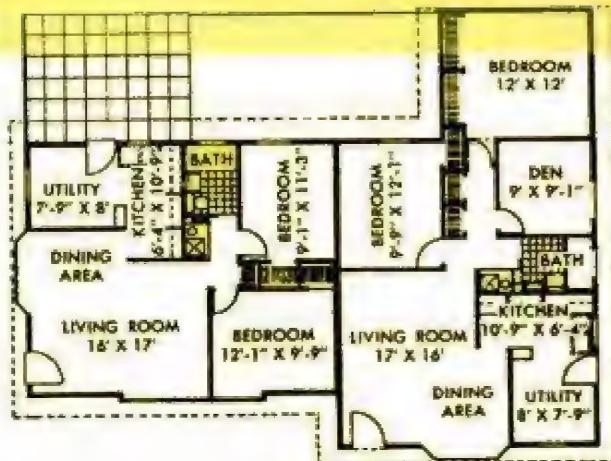




Duplex homes in Hometown (bordering on Chicago) get away from monotony of small homes on small lots

Angeles, sit 25,000 homes inhabited by some 106,000 people. Started in 1934 by Aetna Construction Company and Biltmore Homes, Lakewood is still growing. For \$7895 to \$10,000 today, you may have your choice of 26 basic floor plans and 76 exterior finishes. Focal point for the endless chains of homes is a spanking new \$100,000,000 Lakewood shopping center containing everything from a 30-lane bowling alley to a 250-bed hospital. Music is piped all along the canopied streets and its parking areas hold 11,000 cars at one time. A half-mile tunnel under the stores is the "service entrance" for delivery trucks that back up to underground loading docks, leaving streets clear for pedestrians and baby buggies.

What do you get in this kind of mass housing besides a big community and a cheaper price tag than you'd have to face if you built your home individually? It depends. Some builders put most of the sav-



ing in the price. Others go in for spectacular "solid comfort" and "eye appeal" features. Most combine the two. Among the most spectacular are Henry Cox's fancy dwellings in Orange County, Calif., where a phenomenal amount of house is wrung from every dollar. Cox subdivides orange groves, so that every lot gets two or three trees. His newest 1020 homes (he has built

(Continued to page 288)

Three-bedroom home in Park Forest, Ill., has a 19-foot living room with picture window. It sells for \$14,500

American Community Builders, Inc., photo





The Lifetime Home That Expands and Contracts

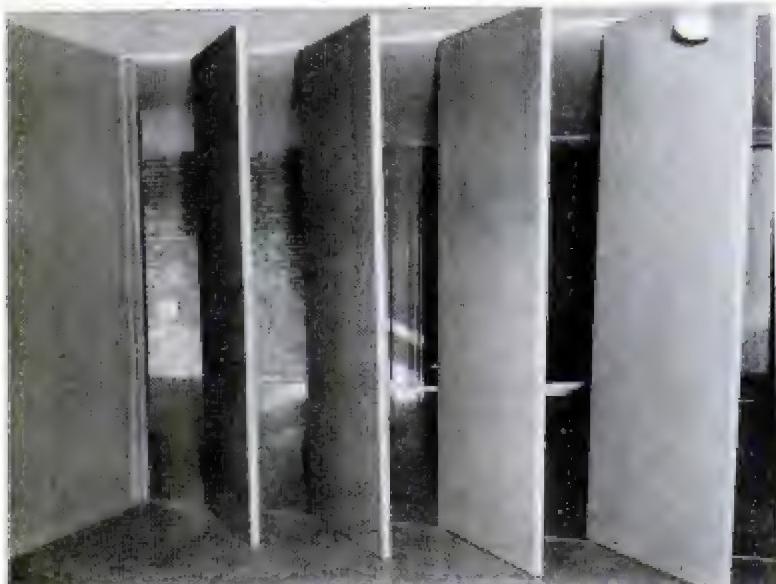
THE ANSWER to a long-felt need is the Flexabilt house built by Frank Robertson, Sr., of San Antonio, Tex., and designed by his son, Frank Robertson, Jr. It's a one-story, two-bathroom house with movable partitions for all rooms except bathrooms and kitchen. Facilities for a kitchenette concealed in one wall make it possible

Low and modern, this convertible home looks like a single-family house. The Flexabilt floor plan above shows the two-bedroom arrangement



Left, bedroom walls are movable partitions which are easily shifted as in bottom left

Below, duplex arrangement provides studio apartment and a complete two-bedroom unit





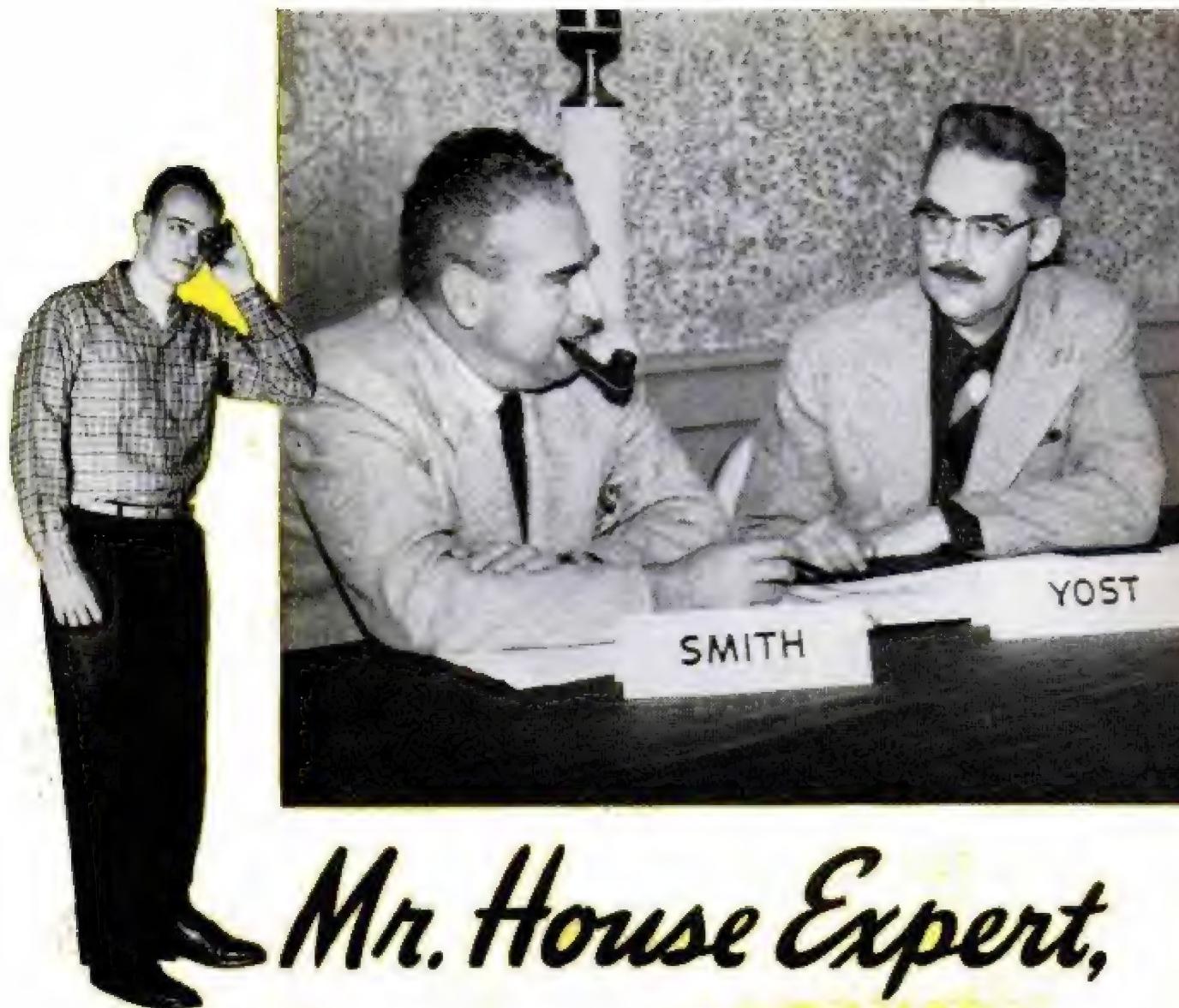
Top, floor plan shows how walls are shifted to create a four-bedroom, two-bath home from the duplex. The house has 72 variations

Top right, mobile wall section stripped of drawers and doors is being tipped into position. Right, closet units form bedroom wall



to convert the house into a duplex. By shifting partitions within the 1250 square feet of floor area, the Robertsons have worked out 72 possible combinations. A young couple can arrange the interior so they can occupy the kitchenette apartment and rent out the larger apartment when their family is small and mortgage payments high. As the family expands and income increases they can move to the two-bedroom apartment and finally convert the house to a single-family home with three or four bedrooms. In later years, as the children leave home, they can reverse the process. Specially-designed for the home are movable storage walls four feet

wide and two feet deep, three-foot-wide wall panels and bookcase-wall units. A plywood panel covers the installations for kitchenette equipment and when the panel is removed it is easy to install a four or five-foot efficiency kitchen unit. The Robertsons are building five demonstration Flexabilt houses, all with carports but with varying exterior treatment, including vertical redwood rough siding, finished redwood horizontal siding, yellow pine and vertical fir siding. All have some stone or brick trim. Although the model homes cost between \$20,000 and \$22,500, the Robertsons expect to build them at a lower figure once they get into production. ★★★



Mr. House Expert,

Don and Jane listen in as a panel of noted housing experts answer questions put to them by *Popular Mechanics* editors. The experts: Earl W. Smith, mass-project builder, El Cerrito, Calif.; L. Morgan Yost, Chicago, chairman of the Committee on Homebuilding Industry, American Institute of Architects; Leonard Haeger, director of Technical Services, National Association of Home Builders, Washington, D. C., and Martin L. Bartling, Jr., director of the NAHB, home builder, Knoxville, Tenn.

QUESTION: What are the first steps any couple, such as Don and Jane, should consider in building or buying a new house?

SMITH: The first step is very basic: They should evaluate realistically their ability to purchase a home. I think one of the major problems is to have to unsell a family on some preconceived ideas of a house they cannot afford. [Ed. note: Mr. Smith is the designer and builder of the house featured at the top of page 148.]

Q: What would you say is a safe yardstick for monthly payments on a home?

SMITH: Generally, somewhere between a quarter and a fifth of gross monthly in-

come. That is the rule of thumb applied by the bank, by the FHA or the VA.

HAEGER: I think we should make clear that the function of the VA and FHA is not to supply funds to the home buyer or builder, but merely to guarantee or insure loans made by lending institutions.

SMITH: Also, the total price of the house is important to consider in relation to the buyer's economic position, but it is not quite as important as the debt-paying ability. There are insured FHA loans and guaranteed veterans' loans which make it possible to buy a house with a low down-payment. Then the monthly payment becomes the most important consideration.



We Have a Question

HAEGER: This is an area where there are no hard and fast rules. Another formula for the total cost of a home a man can afford is to multiply the annual income by $2\frac{1}{4}$ or $2\frac{1}{2}$.

BARTLING: I think we have overlooked one thing in this one-fifth formula for monthly payments. I believe the banker and the FHA pay more attention to the personality, ability and background in terms of paying bills promptly. The credit information is extremely important. [Ed. note: Mr. Bartling is the designer and builder of the home featured at bottom of page 147.]

SMITH: There is a great assistance in terms of mortgage credit now. The man of very modest income can find himself a home.

YOST: The larger the nest egg the more house a man can afford.

HAEGER: There's furniture, too. Might run as high as \$4000.

YOST: That is one reason we are trying to get more appliances and furniture as part of the house itself, so they can finance it over 20 or 25 years. I mean storage walls,

kitchen appliances, laundry, all that sort of thing.

Q: Can you name some specific hidden costs against which people should be on guard?

BARTLING: They should consider the type of structure, whether it will require a lot of upkeep after two or three years. Some materials lend themselves to longer life—redwood versus pine siding, for instance. They should consider the quality of shingles on the roof. Also, is the house weatherstripped and insulated? If not, operating costs will get out of proportion to income.

YOST: The maintenance of a house can add effectively to the monthly payments.

SMITH: I think another piece of advice to the couple going out to build a custom-built home is to seek a good architect who will recommend a good builder. The average lay person is not going to learn very rapidly the difference between the quality



Smith: "We want our customers to own their homes; we do not want the homes to own the customers . . ."

people, in all areas, buy a house for price.

SMITH: The price is all right, if they know the man is behind it with value.

BARTLING: If that is all they buy on, very often they are stung.

SMITH: They have to make sure the firm or individual they are buying from delivers an honest piece of goods.

YOST: The best way to find out about that is to ask people who live in houses that firm or individual has done, either the architect's house or builder's house, whether it is a custom-built house or a mass-produced tract house.

Q: Which should a prospective builder go to—an architect or a contractor?

YOST: They have to decide whether they can afford, or are best served by, a custom-built house, or whether they are going to go to a mass-produced house in which they buy what is produced in a group.

Q: Suppose they feel they cannot afford an architect. What is the best method of procedure?

YOST: Do not say they cannot afford an architect; say they cannot afford a custom-built house. My contention is, they cannot afford to be without an architect if they decide on a custom-built house.

SMITH: In other words, it is a question of their pocketbook. It is like buying an automobile. They might buy a hand-built Italian car which will cost them a lot of money; but they will certainly, in their own minds, know they are able to pay for it. Again, most people, however, will have to buy a mass-produced car which is cheaper, yet much the same as all other cars on the road, and still a very good car.

of materials. They are going to have to take someone's word for it. If they are in the economic group which must needs go into the mass group, or subdivision type of thing, they want to find, again, a builder whose reputation is good.

BARTLING: The thing I was getting at is many

BARTLING: I think, also, what Mr. Yost means is that a really good architect can design a house, regardless of the price strata, and can absorb his fee in better ways of putting it together. Actually, it is not a luxury, in many cases, to have an architect.

Q: Will you give some advice about the architect's fees?

YOST: There is no such thing as a standard fee. The fee depends on the architect's experience, ability and reputation. It also depends on the amount of service he is to perform and whether he takes care of letting of the contract and supervision as well as providing the design, working drawings and specifications. Some famous architects charge 15 percent while a younger man with small overhead and little experience might do the job for 6 percent.

HAEGER: I hope that anything which is said on this panel would not tend to exaggerate the notion that there is some conflict between builders and architects. I think the fact is that the really good houses for any family are designed by good architectural brains, whether they are built on the single-house or group-house basis.

BARTLING: If you build an \$8000 house, or a house costing less, it just automatically rules out hiring an architect.

SMITH: I would not say that. I would say—and I think Mr. Haeger would agree with me—in our postwar experience around the NAHB there has been a growing tendency, on the part of subdivision builders who build in the mass, to employ better and better design talent. Of course, you find such talent in the architectural group.

Q: How can you get the most house for your money? Is it a custom-built, mass-produced, prefab or shell house?

SMITH: It depends on what you want. Value varies in the minds of people. There are those who want certain amenities of



Bartling: "If you build an \$8000 house, or . . . less, it automatically rules out hiring your own architect"



Haeger: "We should make clear . . . function of the VA and FHA is not to supply funds but to insure loans"



Yost: "The traditional house won't continue any longer than ultraconservative minds force it to"

say they cannot afford an architect; say they cannot afford a custom-built house. My contention is, they cannot afford to be without an architect if they decide on a custom-built house.

SMITH: In other words, it is a question of their pocketbook. It is like buying an automobile. They might buy a hand-built Italian car which will cost them a lot of money; but they will certainly, in their own minds, know they are able to pay for it. Again, most people, however, will have to buy a mass-produced car which is cheaper, yet much the same as all other cars on the road, and still a very good car.

Windows to Dress Up Your Home

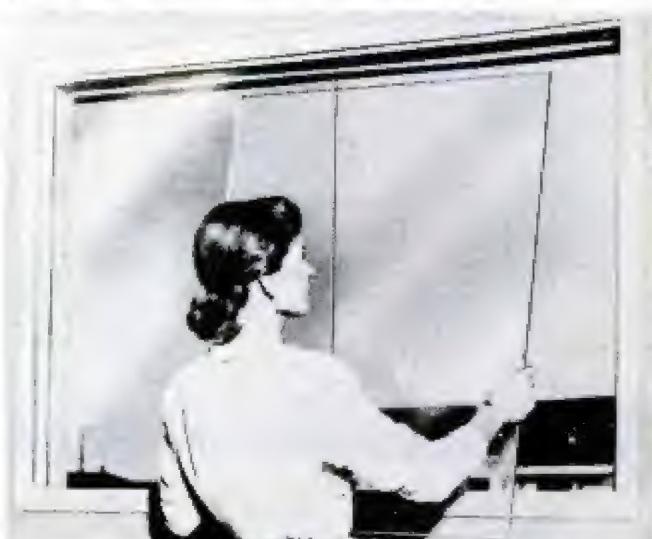
Bulged skylights easily installed on flat or sloping roofs flood rooms with sunlight but stop fabric-fading solar rays. Dead-air space between ceiling layer and bulge gives maximum insulation. Rectangular, square and round windows, clear or frosted, are made



Aluminum window that is removed for washing slides in a rubber-lined groove which holds it in any position. Below, controlled ventilation is possible with tilt-open windows which are opened and closed with a crank



Louver window contains six-inch panes which open or close with movement of single lever, overlap slightly when shut. Below, sashless window consists of two pieces of crystal glass in weatherproof grooves





Forgotten lights are easily turned off with master switch in bedroom. Right, installing the flexible wire

Light Your Home by Remote Control

WITH A REMOTE-CONTROL wiring system you can easily switch as many as nine lights on or off from a single master control. Also, you can install master controls in various parts of the house to suit your pleasure. This is possible with a low-voltage system utilizing a nine-circuit central switch plus push-button switches. The master control operates small motors and electrical appliances as well as the important lighting circuits in the home. You can turn outdoor lights on from the inside, or operate garage lights from indoors and vice versa. The system can be used to turn on the coffeemaker from the master bedroom,

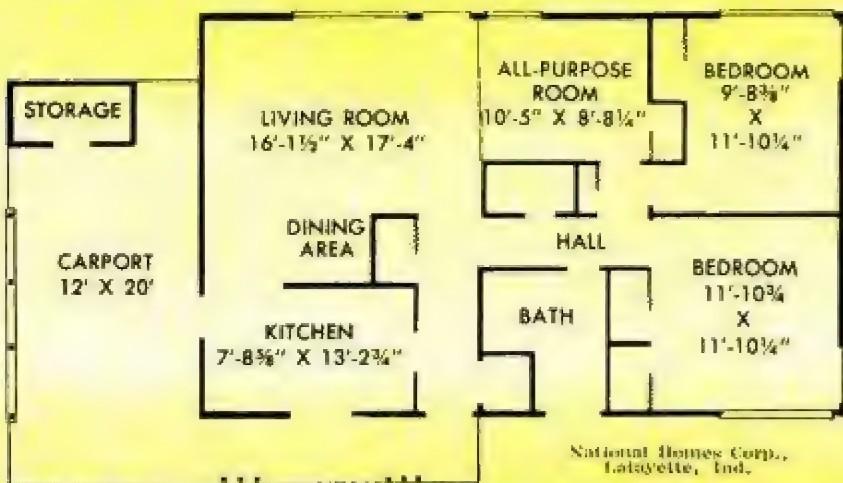
the heater in the bathroom, or to turn off forgotten lights or TV sets. Developed by General Electric, the system uses flat, flexible wires stepped down to 24 volts by a transformer. The heart of the operating system is a split-coil dual-action solenoid that controls 2770 watts of power—yet uses only a minute flow of independent electric current. When installed in a new house, remote-control wiring costs from \$50 to \$75 more than a conventional system. In addition to its use in private homes, remote control for lighting circuits and appliances has many possible adaptions for farms, hospitals, schools, factories and office buildings.

A remote-control master switch can turn off lights or operate electric appliances at nine locations in house, garage or even outdoors





Let's Look at the Prefabs



Don and Jane look over prefab featuring many closets, carport with storage, an all-purpose room that can serve as third bedroom. Price, with washer, drier, dishwasher (but without lot) is \$11,650 in its production area

IN THESE TIMES of continued high costs, the prefabricated house—often dubbed the house of tomorrow—becomes more and more a good bet for the prospective homeowner today. Some 50 well-established prefab manufacturers, who have been and are pioneering a change in housebuilding methods, are investing millions in research, engineering and modern plants. Today they offer everything from cabins to 100-foot mansions in every type of prefab from packages of precut lumber to trailerlike "mobiles."

Page & Hill Homes, Inc., Shakopee, Minn.

The general impression has been that prefabrication meant flimsy construction. This was definitely true with most war-emergency prefab housing, but is a complete misconception in 1953. Precuts, for instance, are built by standard construction methods and with standard materials. An expert can find no difference in the completed house. Other prefab methods are claimed to be even superior to standard construction. The major defect of a prefabricated house—a fixed plan not necessarily tailored to your individual desires—has

Prefabs no longer have corner-cutting look. Many big homes similar to this one are available





Aladdin Company, Bay City, Mich.



Example of a pre-cut house is this three-bedroom home. The basic price is \$4510 for the "package" of pre-cut materials. Homeowner buys his lot and either pays someone to erect the home or does the work himself. Also available are garages to match house



National Homes Corp., Lafayette, Ind.

Walls of four-bedroom home above are prefabricated in panels at factory. Panels then are joined on the site. Home below is available in two sizes, one featuring a 15 by 16-foot living room. The house has perimeter heating, with provision for air conditioning on optional basis. Guniteon Homes, Inc., New Albany, Ind.



Ivan R. Ford, Inc., McDonough, N. Y.



been virtually eliminated with the many plans and models now available.

You don't need a slide rule to realize that power machinery and assembly-line methods of prefabrication can save many man-hours and dollars in the construction of your new home. There are other advantages, too. The prefab manufacturers can and do employ the nation's leading architects—thus producing homes without "plan mistakes" and in full compliance with FHA and mortgage company requirements. Prefabs can also use the best materials, not just those locally available, through quantity buying. Quick erection at the site eliminates damage from lengthy exposure to rain or snow.

Actually, more than 250,000 prefabricated houses have been built in the United States

Factory-built home below can be erected in 55 man-hours, exclusive of asphalt shingles

Four-bedroom luxury prefab has huge windows, year-round air conditioning. Below, 1130-sq. ft. house, also with air conditioning, is less than \$20,000



Atticless Houses, Inc.
New York 105, N. Y.

since World War II. Probably 60,000 prefab houses will be built this year. Pricewise, the big majority of these will be two and three-bedroom homes selling from \$6000 to \$12,000, including erection labor. In this price range there is an excellent variety of both traditional and contemporary designs from which to choose. Some manufacturers will also provide, at extra cost, heating and air-conditioning units and complete kitchen and laundry appliances. Definite savings are claimed by this quantity buying of appliances. A surprising trend was started in 1952 when prefabs also entered the field of more expensive homes, some manufacturers adding a "Cadillac" model to their lines—houses, usually of modern design, offering features that few home buyers associate with prefabrication. Prices of these run \$20,000 to \$25,000.

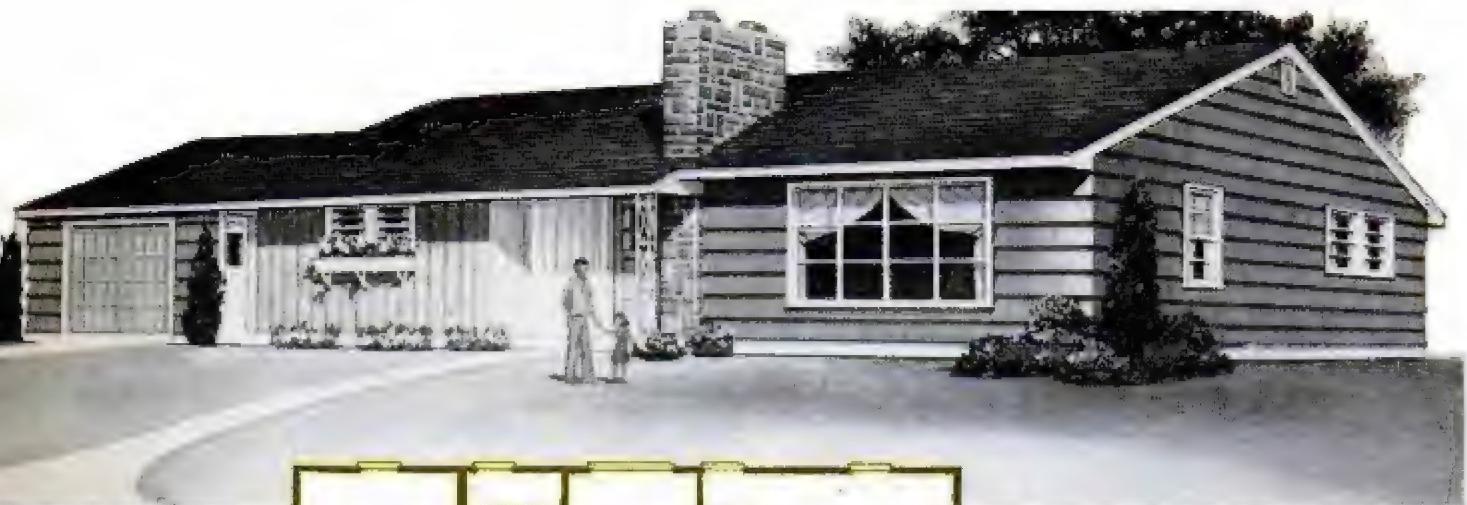
It is not as simple, however, to buy a "mail order" house as it is to order a bill of goods from a catalogue. Because of shipping costs, some prefab man-

facturers confine orders to a 200 to 500-mile radius of their factories. Others ship their houses on a national scale with no limitations as to distance. Some municipal building codes, many of which are sadly in need of reform, are a problem, prohibiting the erection of any prefabricated house. In rare instances, local prejudice can prevent you from obtaining the financing for a factory-built home. If you are interested in prefabricated or partially prebuilt houses, you should understand the four

Pressed Steel Co., Chicago 33, Ill.



Mobile prefab is three trailerlike units fastened together. Above is the big living-dining area



Here's another attractive pre-cut home, modern in design. Conventional building techniques are used throughout, but all parts are packaged and ready for erection. Note big living room and master bedroom. Price for parts is about \$6500. Below, interior and exterior views of prefab exclusively designed for the west. Cost: about \$10,750 with the lot Gunnison Homes, New Albany, Ind.



different types—the pre-cut, the panel, the sectional and the mobile.

When you order a pre-cut house, you will receive all the lumber cut to size, notched and numbered for the particular house plan you have chosen. The Aladdin Company of Bay City, Mich., which has been making pre-cut houses for 46 years, also includes in the package the windows, stairs, shingles, building paper, nails, hardware, paint and even shutters and flower boxes shown on the plan. Several others do the same. From the blueprints and diagrams furnished with the freight-car "package," you can build your own home by conventional construction. You may prefer to have local carpenters build it, and you will still save considerable money because of the factory's savings on the lumber and the fewer man-hours needed at the site. The cost of the pre-cut house packages runs lower than the figures already given, from \$2000 to \$8000, depending on the house size; but this, of course, does not include the erection labor costs.

A panel prefab is quite different and is usually erected by specialists. It is a house formed of ready-built panels, which are often 4 by 8 feet in size and sheathed with plywood. The "Bench-Build Ranch House" in the August, 1951, issue of *Popular Mechanics*, is a good example. The panels can be just the

rough walls; they can also be complete to window glass, doors and interior and exterior finish. For the later type, all that is necessary after erecting the panels at the site is to cover the joints and give the panels a final coat of paint on the outside and paint or paper the inside. Some manufacturers turn out larger panels, in some cases the whole side of a room.

The sectional prefabs are an enlargement on the panel type, usually with more than one wall connected and usually complete to exterior and interior finish, with doors, windows, porch lights and other details factory-installed. In some of these, the sections are complete rooms that specialists fasten permanently together at the site; and at least one is a completely prebuilt house that is sliced into two sections for delivery.

The mobile prefabs are a new trend to answer the shifting housing needs of defense projects, as well as the needs of many families. Here the house is of two or more complete units, each similar to a house trailer, which bolt together to form a full house. The Pressed Steel Car Company's Unishelter is a well-known mobile and is available in models up

(Continued to page 274)



P & H Homes, Harnischfeger Corp., Port Washington, Wis.
Example of a sectional prefab is this house with attached carport and storage wall. Walls are prebuilt at factory, assembled into home upon delivery. A feature of house is pass-through from kitchen to dining area



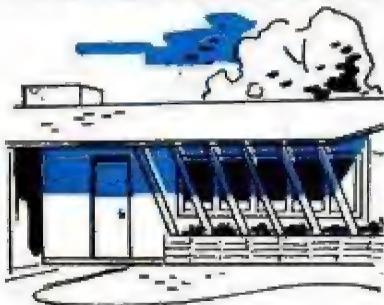
Swift Homes, Inc., Clairton, Pa.
Another precut house with parts ready for assembly is this neat four-bedroom model. Homeowner or contractor provides the lot and foundation, then assembles the parts. Below, this three-bedroom home is erected from completely finished full-length wall sections. The house is sold only through contractors. Depending on size, homes of this type cost \$8500 to \$13,500

Page and Hill Homes, Inc., Shakopee, Minn.

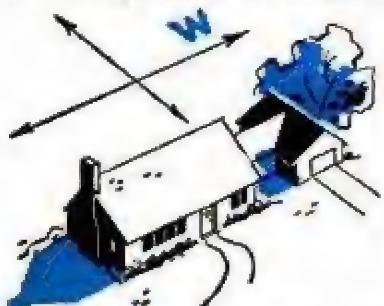




House planned for year-round air conditioning should take advantage of trees which shade in summer, but not in the winter



Where windows are exposed to the sun, some shading device must be provided as in sketch



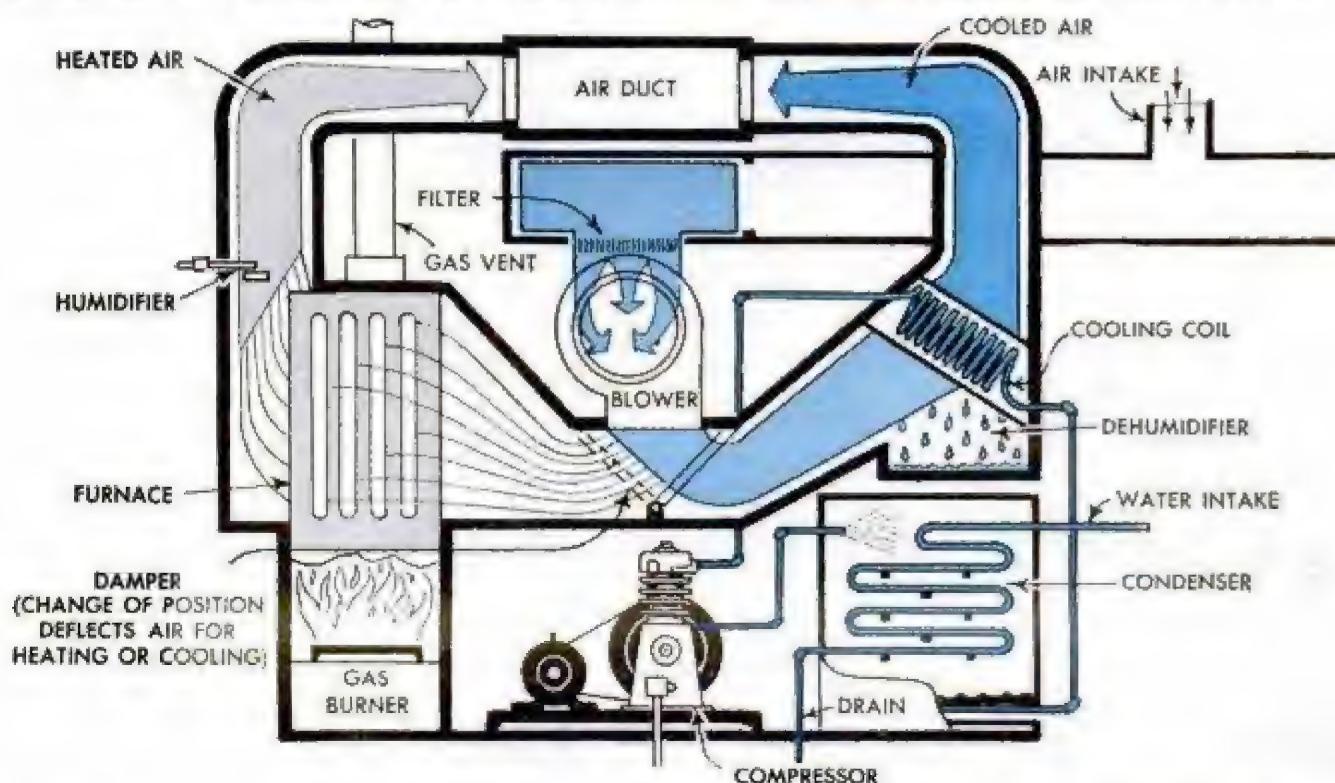
West walls of a well-planned home should offer protection from sun and winds. A garage on west side is one good idea

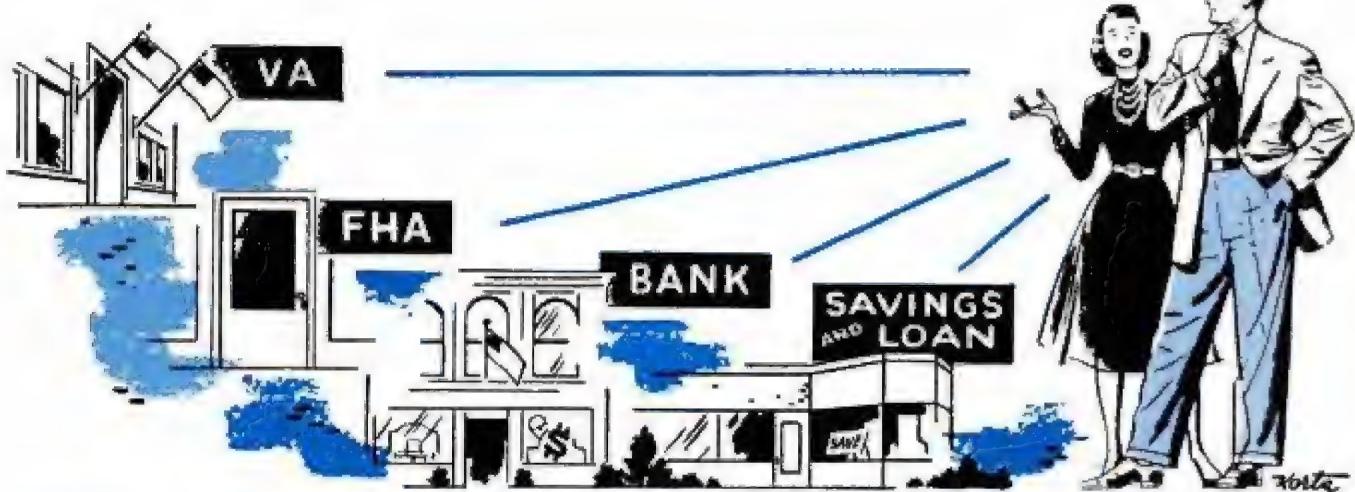
AIR CONDITIONING—THE YEAR 'ROUND

The big news in housing is the dual-purpose heating and cooling units that provide comfortable and healthy living inside the home in winter or summer

ONCE CONSIDERED a luxury item, air conditioning for both large and small homes is fast becoming a reality. One of the reasons for this is the economy effected by dual-purpose units that use the same air ducts for cooling in summer and heating in winter. Many new homes, particularly those being built in warm climates, are designed today to take the greatest advantage of these dual units. Such homes have reduced the cost of maintenance and operation. First of all, the house must be situated on its lot to work with the climate, both summer and winter. West windows, for example, are kept to a minimum or adequately shaded in summer. Trees which are correctly placed provide summer shade and permit the sun's warmth to penetrate during the winter. Overhangs, awnings and sun screens are other effective devices. Double-glazed windows also save money both winter and summer. Other aids found in the properly designed home include insulated walls, ceilings and floors, a properly vented attic and vapor barriers where needed. In addition to the advantages of health and comfort, air conditioning keeps dirt out of the house and saves on cleaning and decorating bills, also on screens and storm windows. Dual-purpose units range in cost from \$600 to \$1000 more than a furnace alone, depending on the amount of space to be cooled. One mass builder is planning a home with a cooling unit at an additional cost of only \$500. In existing homes with a warm-air system already installed, it costs more to add the cooling installation even though the same air ducts are used. Self-contained cooling units are frequently installed in homes having hot water or radiant heating. The installation of air ducts especially for cooling is expensive.

Dual-purpose heating and cooling unit saves hundreds of dollars by using the same air ducts year 'round





How to Finance Your Home

THERE ARE three general types of loans for building or buying a home:

1. Veterans Administration (VA) guaranteed loans.
2. Federal Housing Administration (FHA) insured loans.
3. Conventional loans, which include bank loans, life-insurance company loans and savings-and-loan or building-and-loan association loans.

There are also instances where a purchaser with good earnings or possibilities of good earnings arranges purchase of a home under what is termed a contract for warranty deed to be delivered by the owner after an agreed upon equity payment has been made to him, but these cases are in the minority. Another type is a farm-housing loan made by the Farmers Home Administration of the U. S. Department of Agriculture for the construction and repair of farmhouses and other farm buildings.

VA Loans. Home purchasers should bear in mind that in certain areas veterans loans may be made directly by the VA, but for the most part these loans must be obtained from a lending institution. Veterans are given every consideration both in amount and term of loan. The interest rate cannot be more than 4½ percent.

In certain places, lower-cost homes can be constructed and, in those areas, terms longer than the usual 20 years are granted. However, these matters should be discussed with the lending institutions. Plans, specifications, location and other details should accompany application for a loan.

Type of construction, the city or area in which the proposed home is to be located will, of course, be quite a factor to a lending institution in arriving at what loan it will make. But, supposing all of these factors are favorable and a \$12,000 purchase

price is being considered, it is conceivable that some lending institutions will make a \$10,000 first-mortgage loan. The VA guaranteed percentage (60) of that loan will therefore be \$6000. The unguaranteed portion is \$4000. It is entirely up to the lending institutions whether or not they are willing to lend their money with that amount of risk. The VA can guarantee 60 percent of each loan up to a maximum of \$7500.

In the smaller-cost bracket of home, veterans' loans are easier to obtain in certain areas than in others because the exposed portion of the loan often is negligible. Under VA policies, if it is found that the veteran is paying a price for the home that is not in keeping with the VA's estimate of reasonable value, then no financing is available under this type of loan unless the seller reduces his price. These are matters that the lending officer of the institution considering the loan can usually detect before requesting approval of the loan from the Veterans Administration.

Periodic inspections during construction are made by the VA, similar to those made by FHA, which assures construction in accordance with the plans and specifications. These inspections, of course, protect the mortgage on the house.

It is recommended that in the purchase contract to be signed by the veteran there be stipulated a clause equivalent to: "In the event the purchaser cannot arrange a veterans loan in an amount not less than \$..... on or before a certain number of days, the contract is to be declared null and void and the earnest money deposited by the veteran is to be returned to him intact without any deduction therefrom whatsoever" Therefore, in order that the purchaser may avoid the loss of his deposit or other pitfalls,

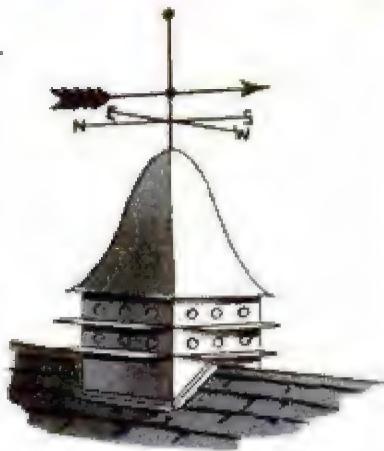
(Continued to page 298)



Just think of the change that can be made in a kitchen by replacing older-type panel doors with louver doors in both wall cabinets and the undersink cabinet. After refinishing, everything will seem new.

20 WAYS TO IMPROVE

By W. Clyde Lammey



GOOD IMPROVEMENTS are simple changes in an existing home unit that do something for appearance, increase value and add to the pleasure and convenience of daily living. They need not be expensive, difficult or messy. Much can be done in both the interior and exterior without taking out walls, cutting through floors, or otherwise materially altering the structure, either old or new. Here are 20 suggestions that have the widest application and do not require major alterations. Certain units pictured come ready-made and are easily installed. Others you make yourself or with the aid of your local carpenter.

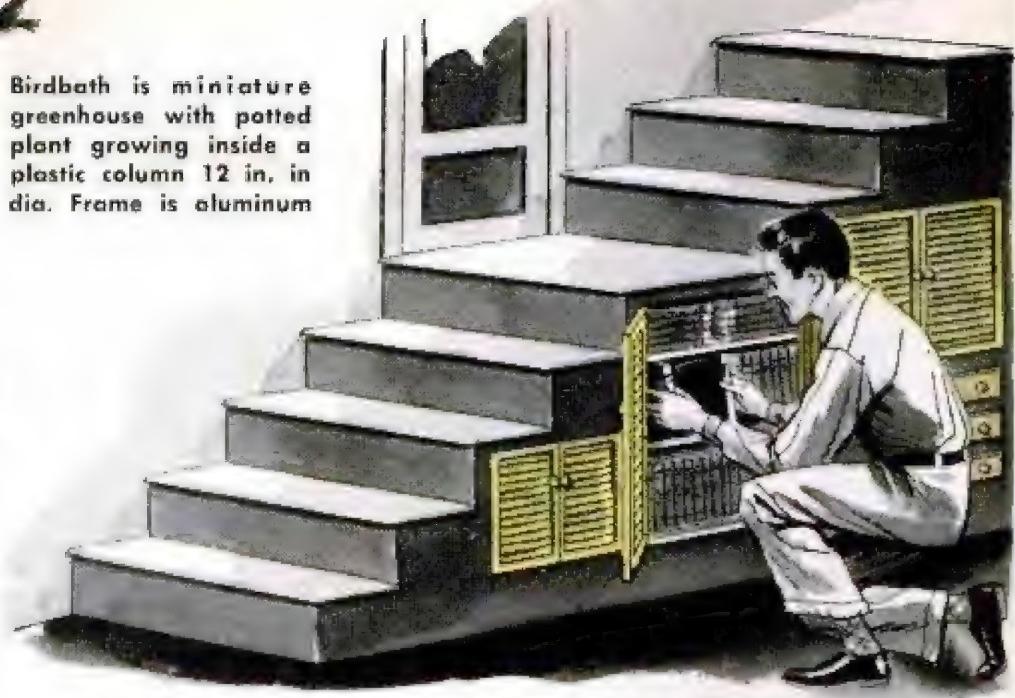
Above, a garage never looks just ordinary after you add a cupola or a weathervane. It's the one finishing architectural detail that does things for the appearance of the whole structure. Available ready-made in a range of styles.

Right, potted plants will thrive the year 'round if you give them their place in the sun with this two-piece window shelf. Shelf is screwed to the underside of window stool and is supported by a butterfly bracket bearing against wall.

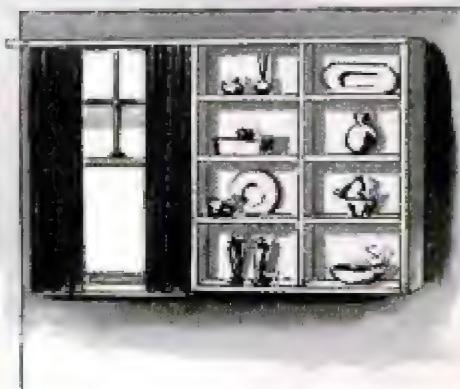




Birdbath is miniature greenhouse with potted plant growing inside a plastic column 12 in. in dia. Frame is aluminum



There's a lot of storage space going to waste under your basement stairs and in a small home that's an item worth accounting. Using plywood and louver doors—these are a must due to ventilation problem—you can build a storage space for canned foods, laundry accessories, tools, even books and magazines you want to keep in a safe place for reference



Decorating a window in the corner of a small room just isn't simple or easy until you utilize the widening effect of open shelves. Open cabinet can be any design—that shown is only a suggestion—but must be full length

YOUR HOME

A clothes closet, planter and bookcase are built into this "island" entryway. Use textured plywood as paneling and plan unit according to space available

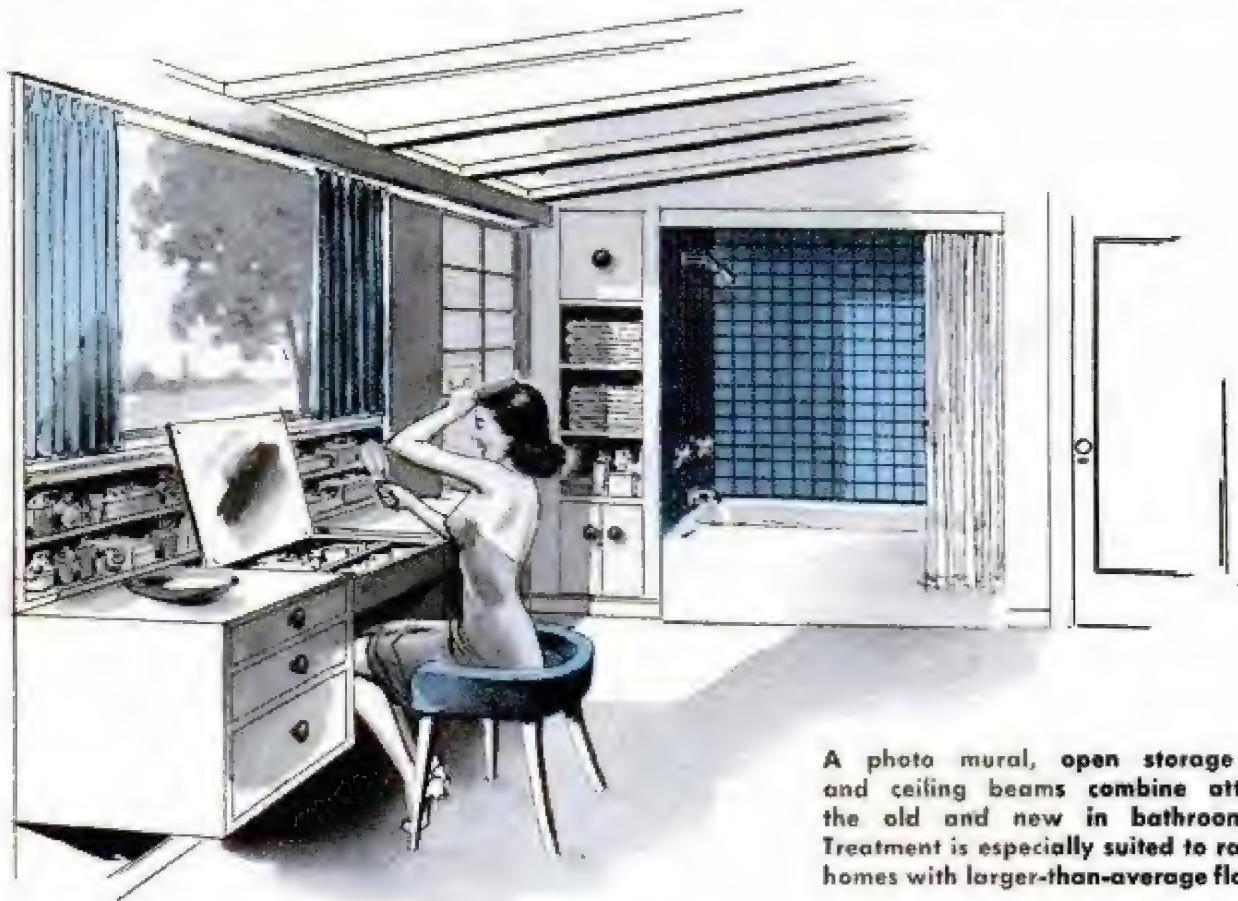




An unused doorway in an older home provides space for an attractive built-in. No need to remove the trim; just install shelves and frame opening as shown



When remodeling a kitchen take into account the possibilities of a peninsula or island sink of the type having two bowls which permit working from both sides of the unit. Saves steps and time



A photo mural, open storage shelves and ceiling beams combine attractively the old and new in bathroom decor. Treatment is especially suited to ranch-type homes with larger-than-average floor areas

When a partition cuts off light—often a problem in older homes—defect can be corrected by installing a vertical jalousie unit that opens and closes

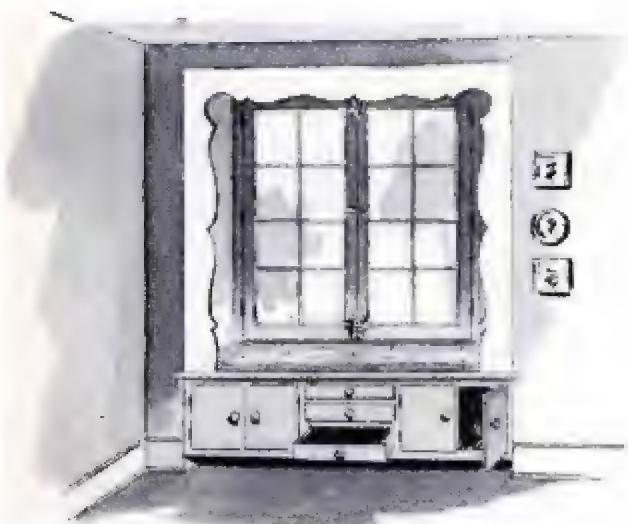
Unsightly radiators under wide windows can be hidden effectively, without impairing efficiency, by means of a built-in having open grille and storage cabinets



Bring outdoors into living or dining areas with this rock-walled planter. Makes an out-of-the-ordinary room divider. Works into nearly all new-home plans



When there's no other place for the laundry chute, locate it in a kitchen cabinet. It's out of sight and out of mind but still useful



An old-style square bay is just the place to build in a window seat. Trim the opening with a scrolled frame and add storage cabinets and drawers below the seat. If there's a cold-air intake under the window, fit the storage cabinets with louver doors



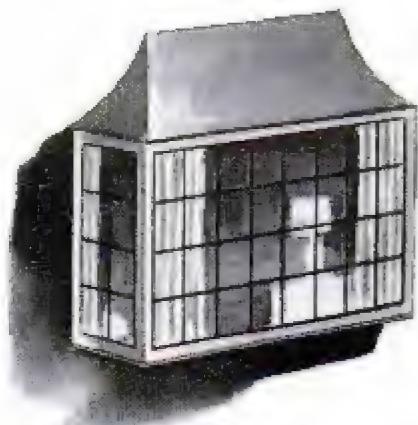
Replacing basement windows on the street side with glass blocks gives you light and privacy in the basement workshop or recreation room. Blocks are easily installed, there are no sash frames to rust or rot



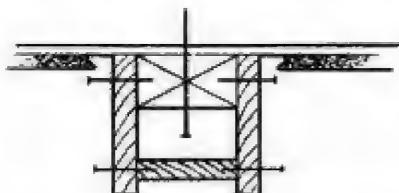
Window shelves divide floor-to-ceiling panes attractively and provide greenhouse growing conditions for potted plants, seedlings and succulents. Of course, no collector will overlook the possibilities for a display of colored glass



Angle bays, also the oriel, or hanging bay, right, fit into the design of almost any type of home, old or new. Usually, removal of an existing window provides at least a part of wall opening required. Bays offer a most inexpensive way of increasing size of small room.



False ceiling beams are not only attractive in themselves but they are an inexpensive way of making a high ceiling appear lower. Sectional detail at right shows how beam is assembled.



A floor-to-ceiling corner window is another improvement to jot down on your list of possibilities when looking over an older house with an eye to modernizing. It's usually effective in a small room due to greater wall space made available.



If you are one of the many home-owners who turns week-end carpenter to beat high labor costs, you'll be interested in knowing about these new "do-it-yourself" building products now available



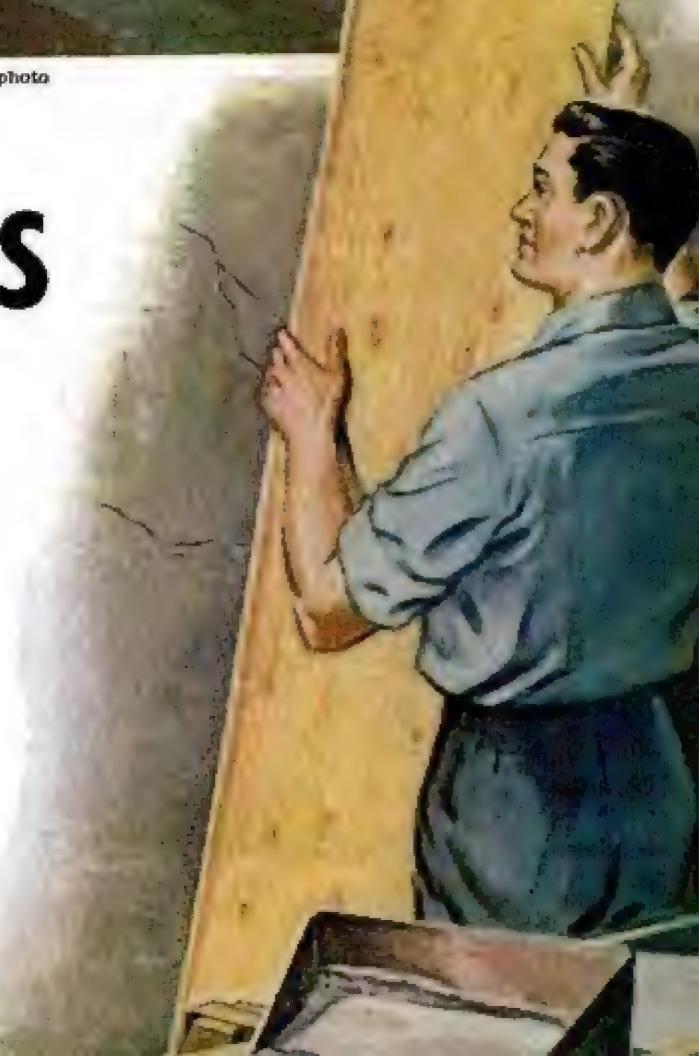
U. S. Gypsum Co. photo

WHAT'S NEW IN WALL COVERINGS

By Wayne C. Leckey

SUCH OLD RELIABLES as common wall-board, plywood and plasterboard are gradually giving way to a host of new and beautiful wall coverings that are making the job of repairing, remodeling and dry-wall construction a homeowner's delight. Anyone thinking of converting attic space into living quarters, transforming the basement into a rumpus room or wondering how to hide the cracks in a plastered wall or ceiling will want to know what's new in wall coverings.

What are some of these new products? One is Panel Sheetrock, a fireproof gypsum wall-board 16 in. wide, that comes in panel form, predecorated in knotty pine and striated finishes to save you both the time and expense of





Placing ribbed texture of "bamboo" tile at right angles to each other produces pleasing basket-weave effect. Irregularities in tile joints are concealed with special colored filler

Courtesy Delta Products Sales, Inc.

Above, bonded to the surface with a special adhesive which is applied with a trowel, this newest product in tile is actually fun to apply. Necessary tools, including joint roller, are available in kit form

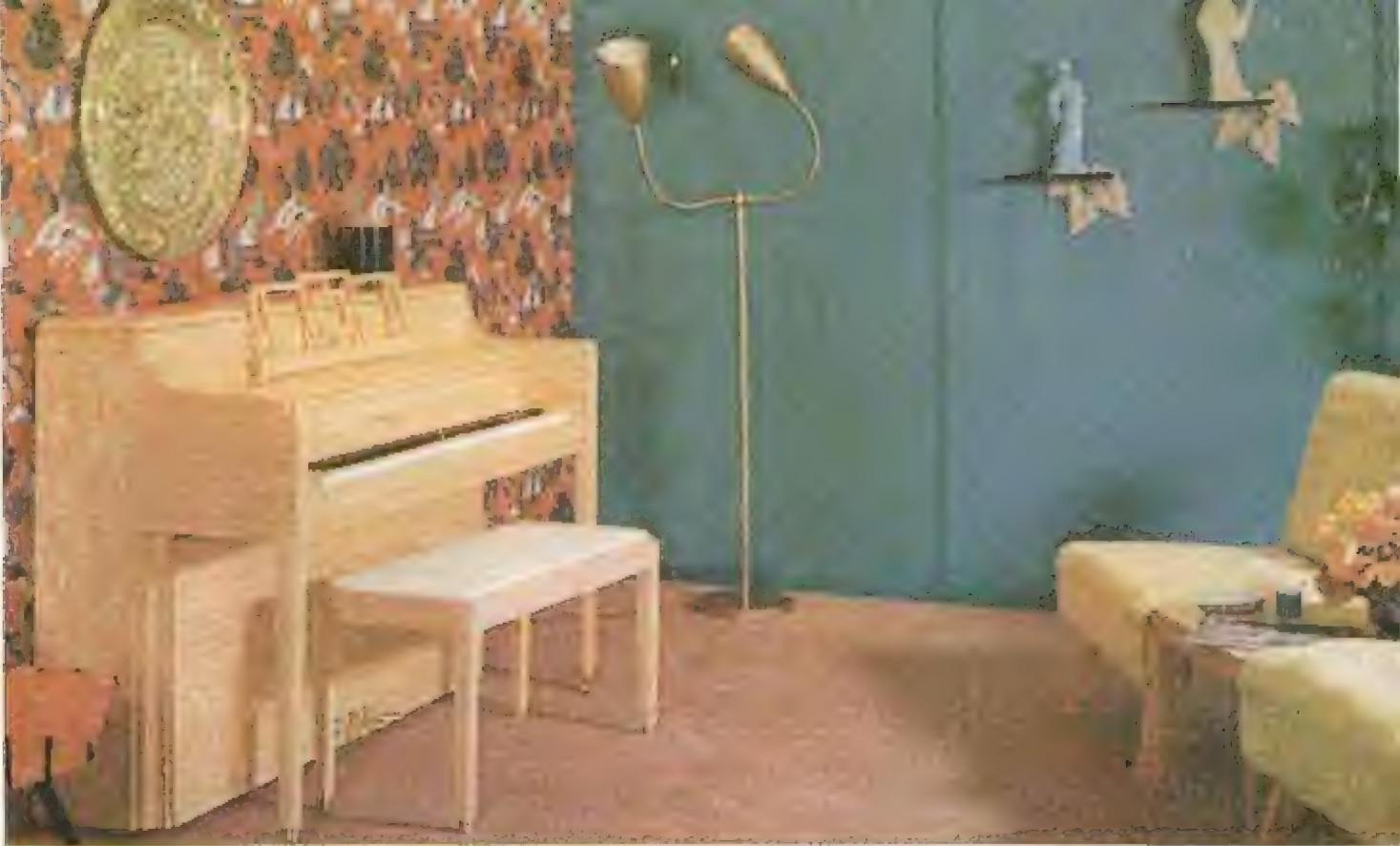
Below, swirling grain of this "sculptured" plywood paneling provides dramatic driftwood effect in keeping with texture decorating. Two-tone color treatment is optional

Georgia-Pacific Plywood Co. photo



Dramatic two-tone harmony of color and texture, as shown at left, is obtained by painting plywood with a base color, then wiping off second contrasting color





Contrasting wall of sturdy striated wallboard, finished green, gives "luxury look" at low cost. Lends contemporary feeling



decorating. The striking effect, as pictured on page 181, closely simulates real wood-grain paneling at a fraction of the cost. It's manufactured from standard $\frac{3}{8}$ -in. gypsum board in 8, 9 and 10-ft. lengths and is faced on one side with a wood-grain paper, lacquer-coated for easy cleaning. Differing from regular gypsum board where joints require taping, seam work is eliminated with this new covering, as the rounded edges of the material are a part of the over-all panel effect. In remodeling, the panels can be installed over existing walls of plaster, or wallboard. For new work, a base layer of $\frac{3}{8}$ -in. gypsum is required. Each panel is individually cemented in place with regular tape-seam cement and the way it is done is told in pictures on page 187.

Where a small-panel effect is not desired, the homeowner now can buy regular 4 x 8-ft. sheets of gypsum wallboard pre-decorated in simulated wood grains which include knotty pine, bleached mahogany and straight-grain fir. The knotty-pine sheets have

Rich, subtle tones of cork wall tile add a distinguished air to any room as shown at right

The U.S. Gypsum Co. photo
square edges which, when butted together, form fine-line joints that look like a part of the wood pattern. The walnut and mahog-

any panels are made with beveled edges to form V-joints. Nailhead treatment is taken care of with special enameled nails which match the particular wood-grain finish.

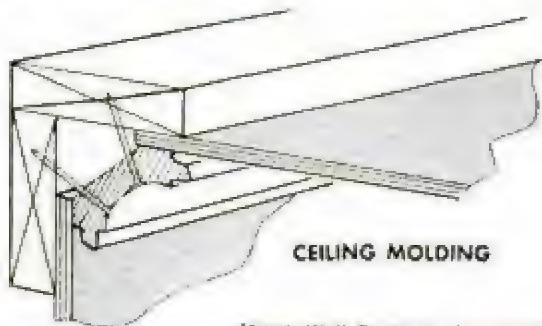
Perhaps newest in the tile field is an 8-in.-sq. vinyl-plastic tile, called Bolta Wall-Tile, which has the realistic look of genuine split bamboo. Claimed not to chip, crack, peel or become brittle with age due to its rubber-saturated paper backing, this semi-flexible material can be bent around corners, resists abrasion and staining, and can be wiped clean with a soapy cloth. It comes in several colors including natural and may be applied to a plaster, plasterboard, hardboard or plywood wall. The tiles are applied

Kentile, Inc., photo





The Upson Co. photo



CEILING MOLDING

Marsh Wall Products, Inc. photo



individually with a special water-soluble adhesive similar to linoleum cement, which is troweled on the surface. The ribbed surface of each tile is placed at right angles to the adjacent one to give a strikingly modern basket-weave effect. A special colored filler is provided to fill any irregularities in tile joints. The same material also is made in roll form 48 in. wide and in a rich, simulated leather-grain texture which offers the same ease-of-cleaning advantage. However, being produced only in large sheets, it is more difficult to handle than the tile squares and, therefore, is not recommended for application by the average homeowner.

A new texture-plywood paneling is WedgeWood, a 4 x 8-ft. lightweight board with a sculptured, swirling grain that lends itself to smart decorative two-tone color effects. The sheets can be nailed right over dilapidated plaster to modernize old rooms, or nailed to studs or furring to form finish walls in new construction. The material may be left in its natural-wood finish, or it may be painted or stained in one or two colors of light and dark shades. The panels are factory-treated with a slightly pigmented resin sealer so no priming coat is necessary before painting or staining.

New among the wallboard group are strong, laminated fiber panels by Upson. Made in sizes large enough to cover a single wall in one piece if desired (8 x 16 ft.), this economical covering comes in standard 4-ft. widths. You have a choice between an attractive pebbled surface or a smart

striated (textured) surface. The panels are pre-sized to provide a perfect painting surface. Whereas the other coverings so far described are primarily designed for wall application, laminated fiber panels are ideal for covering cracked plaster ceilings. The series of photos on page 186 show how this is done.

Long used primarily as a floor covering, the rich, subtle texture of cork tile makes an unusual wall covering for one-wall application. Kencork, one of several brands of cork tile on the market, comes in random natural tones, ranging from light oak to dark walnut, and in four standard sizes: 6 x 6, 6 x 12, 12 x 12 and 12 x 36 in. It may be obtained either factory-waxed or in a natural finish, with beveled or square edges.

Lustrous, plastic-finished panels, called Marlite, offer the homeowner a beautiful wall covering that comes prefinished in some 67 striking color and pattern combinations. Featuring a permanent baked-on finish that wipes clean like glass and never needs refinishing, the paneling faithfully reproduces the rich coloring and grain of actual, fully finished wood-grain and marble patterns. The "decal" veneers are bonded and sealed for life to panels of smooth hardboard. The panels are available in 4 x 6 and 4 x 8-ft. sizes. They are cemented in place and neatly trimmed with special metal molding.

A new and completely different wood paneling has made its debut under the trade name of Novoply. A predecorated board in its natural state, it forms a distinctive wall covering as well as a warp-free material for furniture, cabinets, sliding



Novoply



Peg-Board



Plyweave



United States Plywood Co. photo

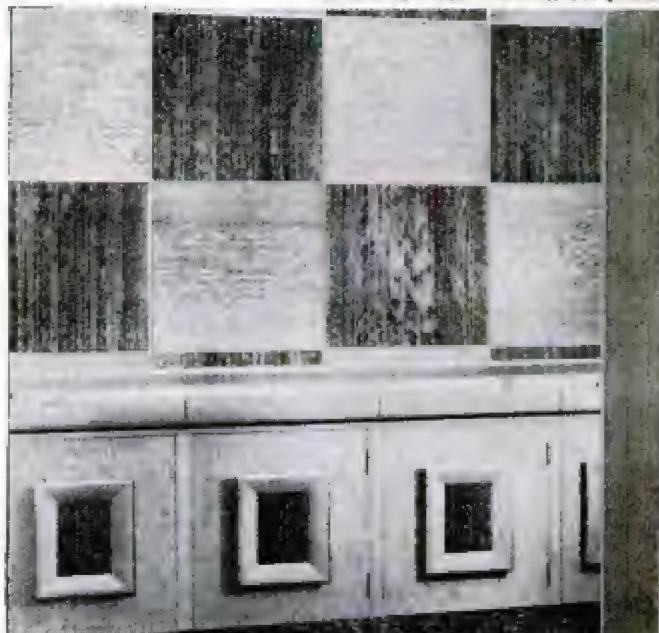
A predecorated board in its natural state, this warp-free plywood is ideal also for cabinets, furniture



B.B. Butler Mfg. Co., Inc. photo

Above, perforated board presents brand-new concept in wall paneling, provides smart modern pattern and is highly functional. Below, checkerboard pattern of texture plywood adds interesting, one-wall contrast

M and M Wood Working Co. photo



Covering Cracked Ceiling With Laminated Wallboard



The Union Co. photos

First step in re-covering a cracked plaster ceiling is to nail 1 x 3 furring strips, 16 in. apart, to old ceiling



Padded block is used to force prongs of fastener securely into rear side of the wallboard



Next, special metal clips, called floating fasteners, and which anchor the wallboard securely from the back, are nailed to the furring strips. Below, T-shaped prop of 2 x 4s is used to hold wallboard sheets in position against furring strips

doors and built-ins of all kinds. Made of resin-coated wood flakes and chips bonded under pressure, this new version of plywood takes on an attractive variegated texture that requires no painting or staining. It comes in two thicknesses, $\frac{3}{8}$ and $\frac{3}{4}$ in., and is lower in price than common plywood due to the fact that it is manufactured from waste timber normally unusable.

While Peg-Board, a comparatively new perforated hardboard, has found wide use as a display paneling, it also offers a functional, versatile, as well as decorative, wall covering for the home. Some 60 different hanging fixtures, all interchangeable without screws, match holes in the perforated board and provide countless picture

Finally, specially designed wooden moldings are applied over joints and at ceiling line



How To Apply Gypsum 16-in. Panel Board

Home
Section



Panels are cut by cutting through paper covering on both faces, then snapping off to break gypsum core



U. S. Gypsum Co. photos

Surplus cement, which is applied with notched spreader, is transferred to next panel in manner shown above

and shelf-arrangement possibilities without damage to the wall. In addition to a smooth surface, the perforated board can be had in an attractive simulated-leather texture.

Popular among the textured boards recently introduced is Plyweave, a fir paneling which makes a most attractive wall covering. Because it is made under heat and pressure, it presents a hard surface not easily scarred and is simple to clean. Finished with a base coat of white paint, topped with a gray glaze, which is wiped off with a cloth, a pleasing three-dimensional effect is obtained.

Several of the coverings described are one-wall coverings. Many times the overall effect is monotonous when the same covering is used on all four walls. By combining the texture of two different boards, a pleasing contrast results. ★ ★ ★

Single nail driven through panel at ceiling keeps top edge tight against wall. Molding covers nail



Above, place the first panel at a corner and plumb it with a carpenter's level. Press board lightly against surface to assure even adhesion. Below, succeeding panels are kept snug by tapping with 2 x 4



Dolly Moves Scrub Pail and Brush Easily as You Wash Floor



A dolly that holds a brush and pail and can be rolled with you as you work, will save much time and energy when scrubbing floors. To make such a dolly, use a piece of $\frac{3}{4}$ -in. plywood, $10\frac{1}{2} \times 14\frac{1}{2}$ in. as the base. The sides are made from 1×3 lumber, $14\frac{1}{2}$ in. long, and the endpieces are of the same stock, 12 in. long. The divider is a $10\frac{1}{2}$ -in. length of 1×2 lumber. After assembling the dolly with glue and screws, swivel casters are attached at each of the four corners. The divider is located $10\frac{1}{2}$ in. from one end of the dolly, making a large compartment for the pail and a smaller one for the brush and soap. To finish the dolly, paint or varnish.

Removable Ventilating Fan Installed in Kitchen Window

For apartment dwellers and others who need a kitchen ventilating fan but cannot install a permanent one, this removable fan is the answer. A 6-in. fan is mounted in a panel of $\frac{1}{2}$ -in. plywood which has been cut to fit in the upper part of the kitchen window, as shown. Small aluminum fins are attached to the outside of the ventilator, pivoted to open when the fan is blowing, and close when the fan is inoperative. To lock the window with the fan installed, nail a crosspiece just over the top rail of the lower sash. The unit can be removed in a few minutes.

Robert M. Kinney, Detroit, Mich.



Warped Plywood Closet Doors Straightened by Turnbuckle



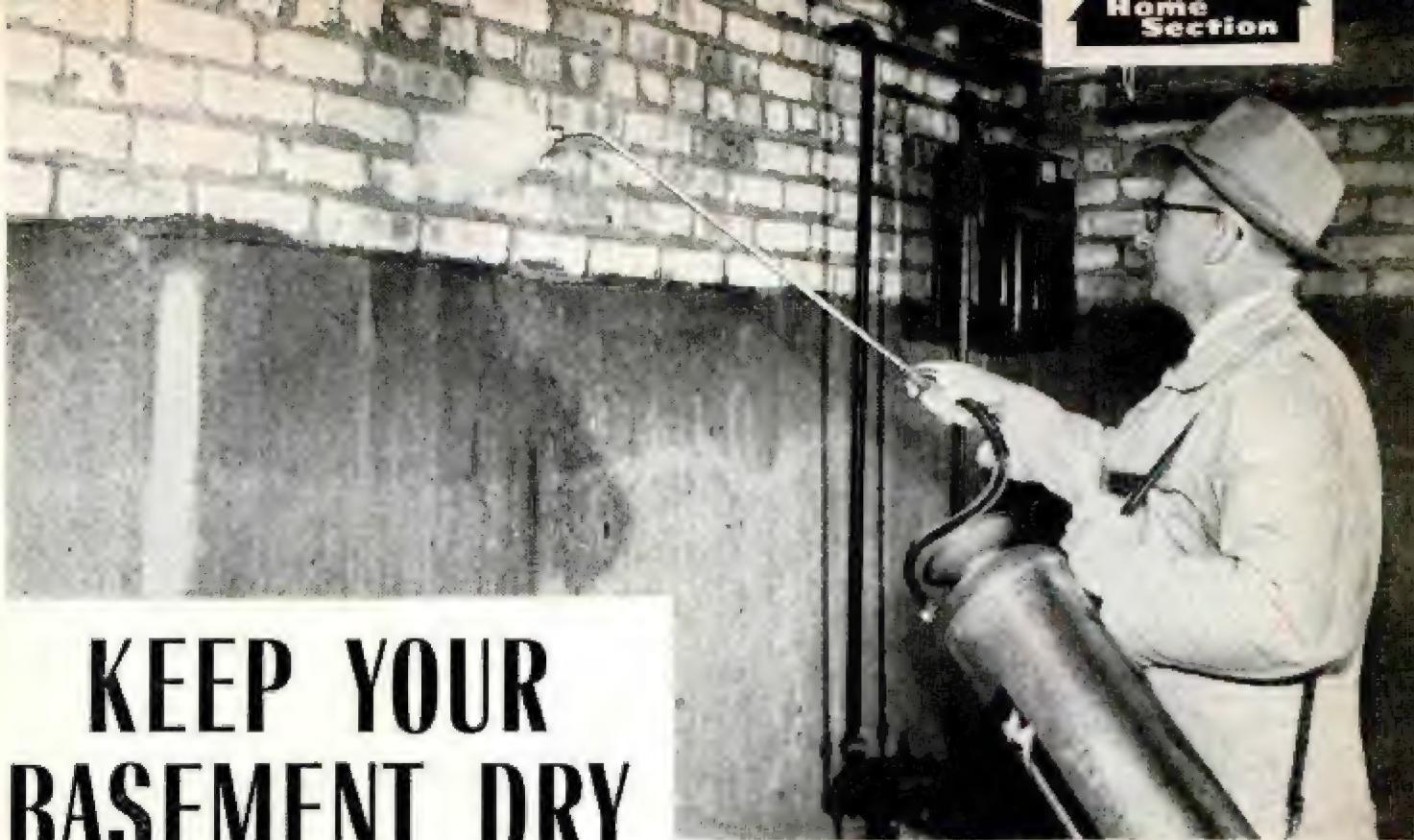
Long narrow doors consisting of plywood panels without framing, frequently used on closets and cabinets, may become warped and thus not close properly, giving an unsightly appearance. If this has happened to such a door in your home, you can remedy the situation by fastening an ordinary screen-door brace to the inside face of the door. Fasten the brace vertically on the door and place two wooden blocks under it. Then tighten the turnbuckle until the top and bottom of the door are pulled into line.

Kenneth R. Greene, Tescott, Kan.

Avoid Mixed-Wood Flooring

Mixing different species of wood flooring is a practice that should be avoided. Northern hard maple, for instance, is the hardest of the floorings commonly used in present-day construction and should not be mixed with soft maple or other woods of inferior wearing qualities. If this is done, the floor does not wear uniformly and irregular surfaces eventually develop.

James DeLorme, Jackson, Mich.



KEEP YOUR BASEMENT DRY

By James R. Ward

THERE'S ONE PROBLEM that frequently keeps the basement from becoming one of the most useful areas in the home. That problem is moisture. Troublesome in varying degrees, from dampness penetrating the walls to severe water seepage, basement moisture not only rusts tools and causes mildew, but often makes it impossible to use the basement even for a home workshop, much less a rumpus room or living quarters.

If proper measures for preventing basement dampness were not taken when your home was built, you can eliminate the trouble and make your basement livable by

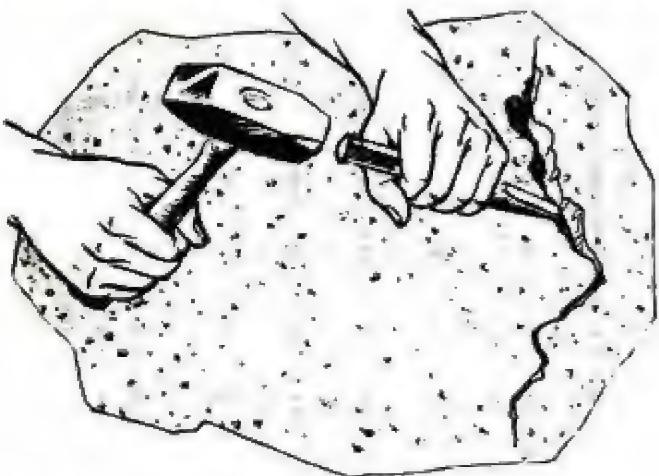


Photo above pictures "waterlogged" corner of basement. The corner is shown below, after waterproofing

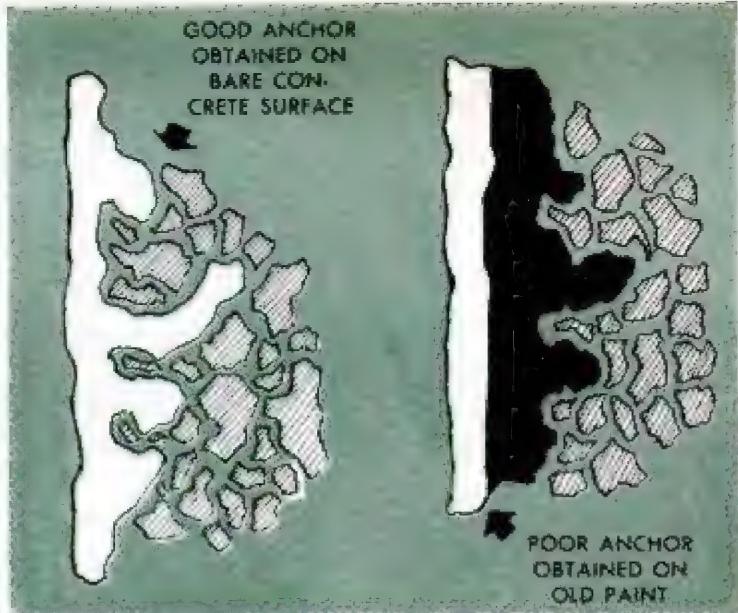




Unpainted wall is cleaned with scrubbing brush and washed down. Efflorescence should be removed by etching and rinsing. Allow walls to dry before painting



To seal cracks in walls, undercut with cold chisel, above, and fill with cement-paint mortar, as below

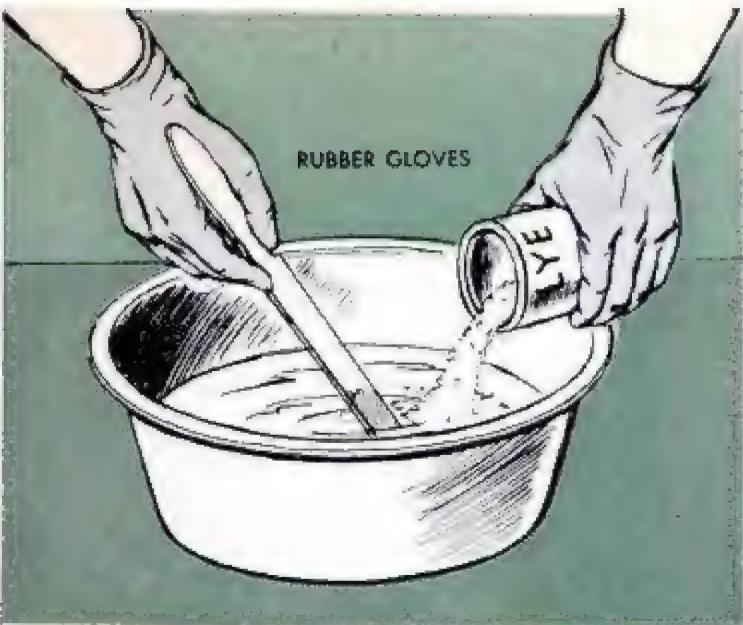


Drawings above illustrate how removal of old paint from masonry surface permits new coating of cement paint to obtain good anchor on the porous surface

sealing the walls and floor with cement paint which actually becomes part of the masonry. In addition to waterproofing the masonry, the cement paint, which is available in white and pastel colors, will improve its appearance to a surprising extent. Even though the basement is reasonably dry at the present time, cement paint can be used to give it a final dampproofing for added comfort. Rox, one of several popular brands of this paint, was used to finish the basement pictured.

The first step in waterproofing your basement is to clean the surface of the masonry. If the surface has not been painted, a brisk "going-over" with a wire brush and a wash-down with water will usually prove satisfactory. Any efflorescence (salts in the masonry) should be removed with an etching acid, following the acid application with a thorough wire brushing. Then the acid is neutralized by rinsing with water. In both cases, allow the masonry to dry thoroughly before painting.

A better bond is had if the masonry has never been painted. The reason for this is illustrated by the drawings at the top of the page which show how a coat of old paint will keep the cement paint from anchoring solidly to the masonry. Whitewash or calcimine can be removed by scrubbing with hot water. For water-soluble, resin-based paints, use a 20-percent solution of muriatic acid, rinsing with water after applying the remover. In addition to removing most of the old paint, the acid will also etch the surface to provide a better bond for the cement paint. To remove oil-based paint, use a solution of lye, 1 lb., to water, 1 gal., working the solution thoroughly into the masonry surface. Be sure to wear rubber gloves when mixing and applying the



When mixing a lye solution for removing oil paint from walls, be sure to wear rubber gloves, as above

lye solution, as well as muriatic acid, and then rinse the wall carefully. An ordinary scrubbing brush is excellent for applying the paint remover.

Although the basement floor may not have been painted, etching the concrete with a 20-percent solution of muriatic acid is recommended before applying the cement paint. Wear rubber overshoes and gloves when working with the acid and wash the floor thoroughly with water after etching.

Cement paint is literally scrubbed onto masonry surface, using an ordinary fiber scrubbing brush. Care must be taken to fill all depressions and small cracks with the paint. Two coats are required to seal the wall

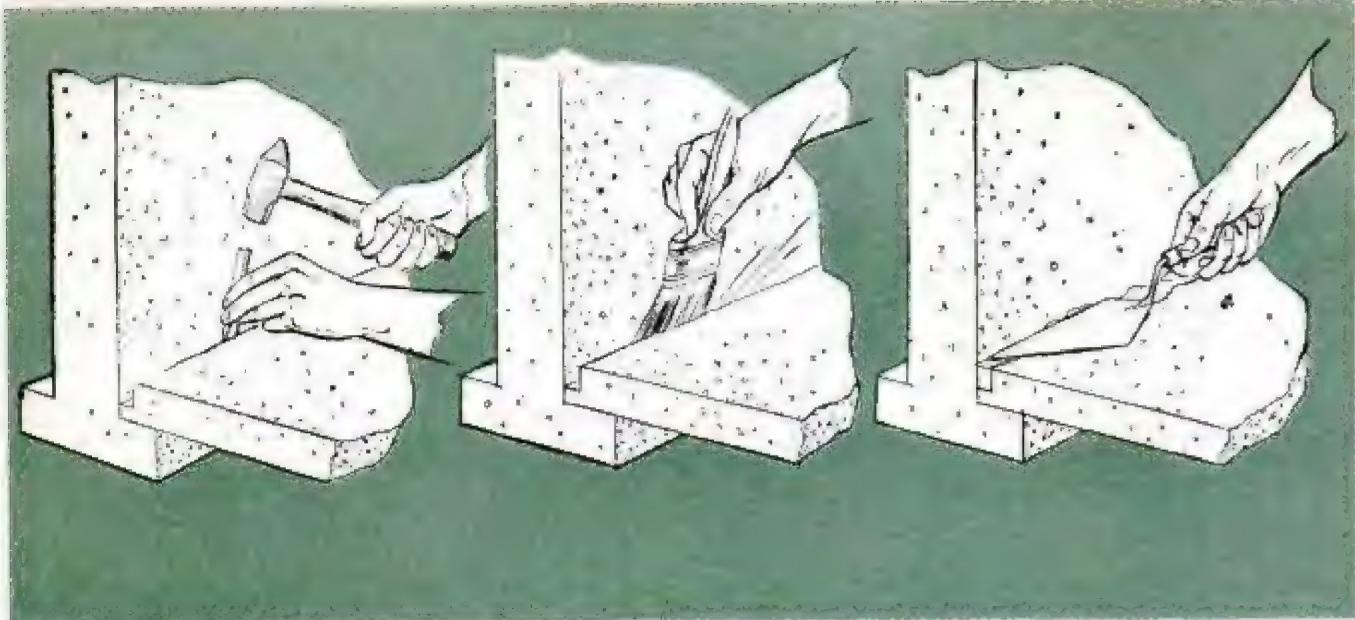


When the walls have been properly prepared, the next step is to mix the cement paint, following the manufacturer's directions carefully. In the case of the Rox paint, 10 lb. of powder was mixed with 2½ qt. of water for the first coat, and 10 lb. of powder with 3 qt. of water for the second coat. This should be done by measuring the powder into a clean pail, adding just the right amount of water and stirring until completely mixed. Use a paddle to mix the paint—do not mix with your bare hands—and don't mix more paint than can be applied in about 2 hr. Stir the paint frequently while using.

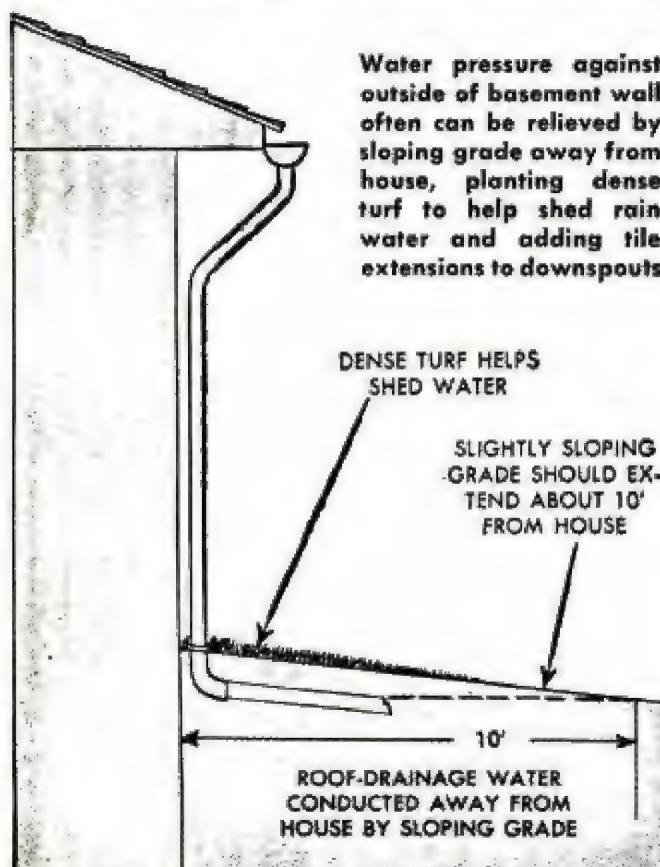
To apply the first coat, begin by dampening the wall. Use the finest possible spray from your garden hose or, better yet, dampen the wall with a portable garden sprayer, as in the photo on page 189. Spray sections of the wall just before you are ready to paint them so that the surface of the masonry is damp but not wet. Do not soak the masonry before painting.

Apply the cement paint to the dampened wall with a scrubbing brush, as in the photo below, being careful to fill all depressions and small cracks with the paint. When you reach the bottom of the wall, scrub the paint into the corner formed by the wall and floor, coating at least an inch of the floor along the wall.

After the first coat of cement paint has dried for 48 hr., the second coat may be



Wall-floor joint is painted with scrubbing brush, as above, bringing paint at least an inch over floor



Leaking joints between basement walls and floor slab can be sealed with a mix of cement paint and sharp sand. Widen joints with chisel and brush out

applied. In this case, do not dampen the wall before painting. Simply scrub the second coat of paint right over the first one, handling the paint in the same way. Note that the second coat is slightly thinner than the first coat, and also that you will get three to four times as much coverage. Allow the paint to dry overnight. Then, in the morning, dampen the painted walls with a fine water spray and repeat again in the evening. Paint the floor in the same way as the walls.

Filling cracks and holes with cement paint is shown on page 190. Undercut and, where necessary, widen the crack with a cold chisel. Then brush out the masonry particles. Make a fairly stiff paste, or mortar, by mixing cement paint, 1 part, and sharp sand, 2 parts, with just enough water to bring the mortar to a workable consistency. Then, dampen the crack—don't soak it—and trowel on the mortar.

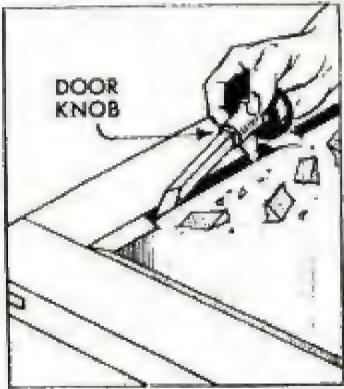
Leaks at the joints where the concrete floor slab joins the walls can be stopped similarly, as detailed above. First the joints are widened with a cold chisel. Then they are brushed out thoroughly, and finally, the stiff mortar is troweled into them.

Pressure from rain water is one of the chief causes of leaking basement walls. This can be relieved by draining the water away from the house as in the detail at the left. Note how the grade is sloped away from the house and also that the end of the downspout is brought into several lengths of tile to conduct the water away from the foundation.

Cement paint can be used on masonry surfaces on the outside of the house as well as on the interior. It is not recommended, however, for use on lime brick or block.

★ ★ *

Chisel for Removing Sash Putty



A chisel made from a discarded doorknob and shaft will come in handy for removing hardened putty from a window sash. Grind the end of the shaft to a beveled point.—G. E. Hendrickson, Argyle, Wis.

Stop Stains from "Bleeding"

When painting over woodwork which has been stained a mahogany or dark walnut, it is good practice to test it for "bleeding." Brush white paint on a small area and see what happens to it after a week or so. Sometimes the oil in the paint activates the old dye in a matter of hours, or it may take several days. If no discoloration takes place after a reasonable exposure, it may be assumed that the old stain will not bleed through the new paint. If the stain does bleed, and turns the test paint pink or brown, it must be removed before the new paint is applied. The stain may be soluble in oil, water or alcohol, and after you have determined which will dissolve it, the area to be painted should be washed with the solvent. Then give the area one or two coats of shellac to seal it before applying the new paint.

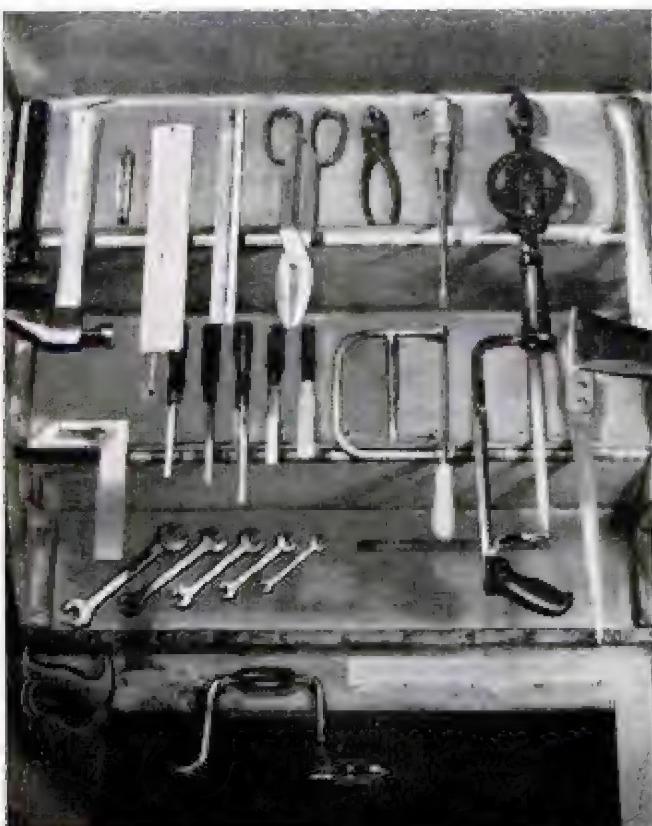


Framed Opening in Partition Wall Forms Telephone Shelf

To save steps when answering the telephone, one homeowner has built this "window" between the kitchen and living room of his home by cutting through the partition wall between studs and framing the opening. The window trim matches the wood-work in the room in which it faces. To close the window and prevent cooking odors from entering the living room, a sliding panel could be installed if desired and a wide sill for a note pad can be included.

A. M. Wettach, Mt. Pleasant, Iowa.

Underside of Basement Stairs Used as Out-of-Way Tool Storage Rack



Confronted with a storage space problem, one home-workshop owner used the underside of his basement stairs as a ready-made tool rack. After a few minutes devoted to installing hooks, hangers and clips, he had a convenient tool board. Because of the step construction, he found that more tools could be stored in less space by using this method.—J. W. Schwartz, Ames, Iowa.

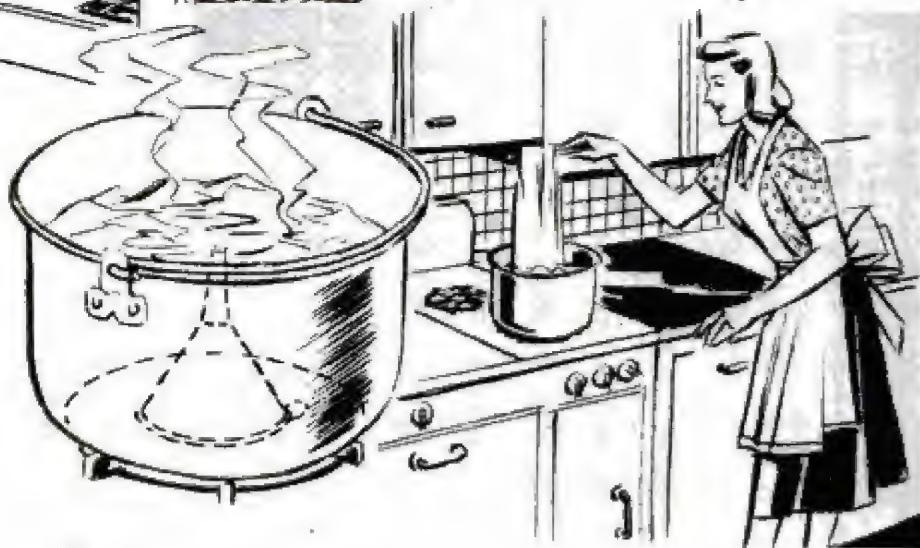
Concrete Should be Left Unpainted If Test Shows Dampness

Concrete floors that are known to be damp should not be painted. Pressure from outside or underneath often forces moisture up through below-grade floors, bringing active alkali which mixes with the oil of the paint and produces a soap. To determine whether a floor is too damp, place a small section of linoleum on the floor for several days. If the area beneath it appears damp, paint failure will likely result. Alkali-resistant paints can be used where there is only a trace of dampness.

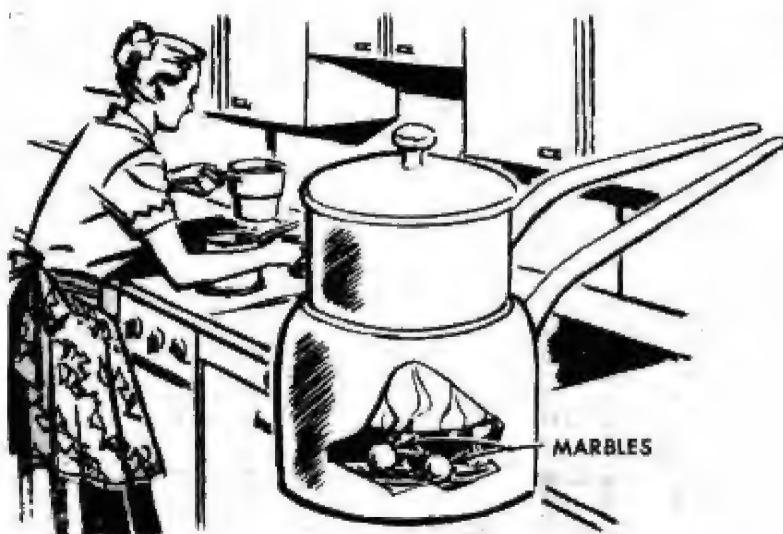
Solving Home Problems



WARM-AIR REGISTER installed in floor beneath kitchen sink permits quick drying of dish towels and ventilates sink-cabinet area. Cabinet doors are fitted with grilles for positive circulation of air

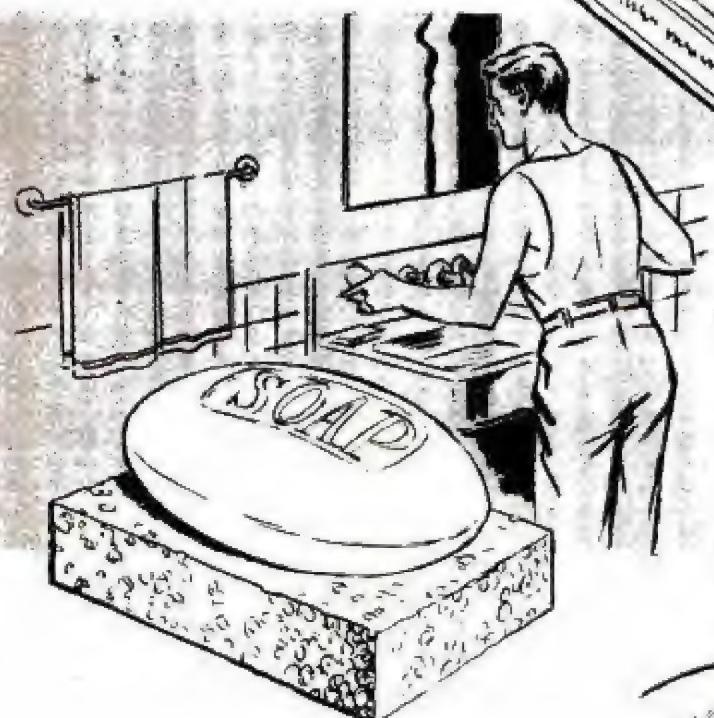


FUNNEL set in center of dye kettle keeps fluid circulating to help eliminate dark streaks in fabric. Heated dye "percolates" through funnel spout, and boiling agitates funnel sufficiently to allow fluid to flow under rim. Continue to stir dye in the usual manner



MARBLES in bottom of double boiler give warning when water has almost boiled away. As water becomes dangerously low, marbles will bounce noisily on bottom of pot so you'll know it's time to add water

CARDBOARD MILK CARTONS are just the thing for storing leftover food in the refrigerator. Cut off bottom section of carton, leaving a couple of inches of the sides intact. After filling with food, cover with wax paper, if desired. Square cartons take up less refrigerator space



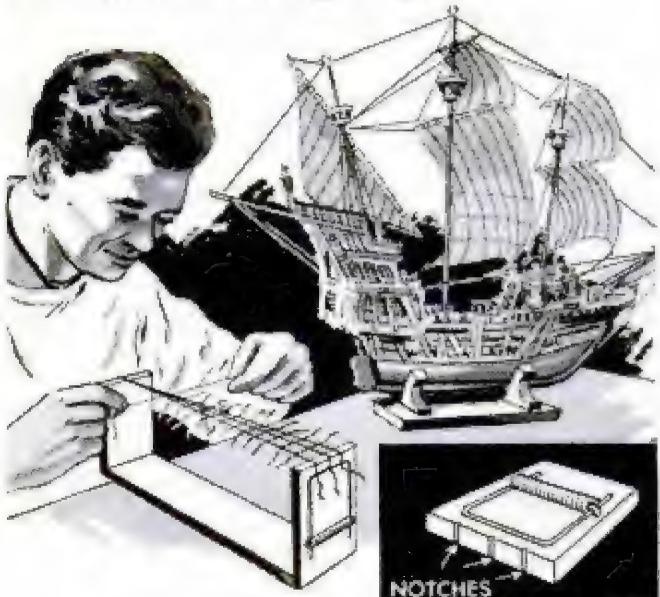
CELLULOSE SPONGE provides neat soap "dish" for bathroom lavatory, as it absorbs water from bar of soap and does not slip on the porcelain. Sponge also is convenient for wiping off basin

SPLASHING of wash water from discharge hose of washing-machine pump is avoided by clamping a cloth sleeve to end of hose. Sleeve is made from leg section cut from cotton sock



TO PROTECT WALLS from being marred by metal rim of wastebasket, apply $\frac{3}{4}$ -in. adhesive tape or masking tape all around the rim. If you wish, use decorative tape of a color to match the room

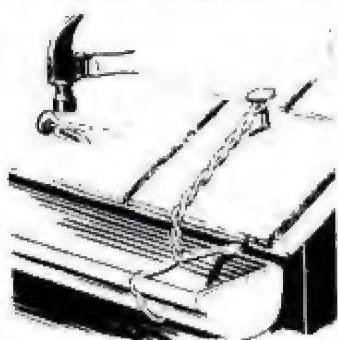
Jig Aids in Tying Ratlines For Model Sailing Vessel



To simplify tying ratlines when rigging model sailing vessels, one modelmaker uses a jig made from two mousetraps and a plywood base. The traps are screwed or nailed vertically to the ends of the base, the latter being cut to suit the length of the shrouds. The edges of the trap are notched for proper spacing of the shrouds, and the trap jaws hold the shrouds taut while the ratlines are tied.

Louis Booker, Louisville, Ky.

Eaves-Trough Hanger Eye Crushed to Hold Nail



By crushing the eyes of eaves-trough hangers over nails, a metalworker found that he could simplify the job of hanging eaves-trough sections. The crushed eye holds the nail so

that it may be driven with one hand while the other hand holds the trough in the proper position. Thus one man can hang an eaves trough with a minimum of juggling.

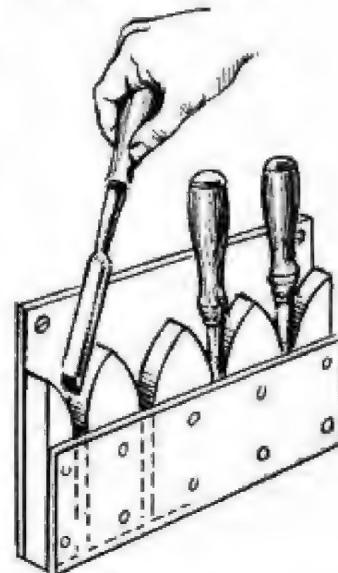
Milk Cartons Burned as Flares

When a flat tire or engine failure forces you to pull off to the side of the highway at night, use a milk-carton signal flare to warn approaching motorists. Quart-size milk cartons provide economical, long-burning lights. Place one at the front of the car and another about 25 ft. in back of it. Then light the flap which covers the opening of each carton. Some roadside sand

or a few pebbles dropped in the bottom of the carton will hold it upright and keep it from blowing away. It is worth-while to carry half a dozen of these "flares" in your trunk for night-driving emergencies.

Chisel Rack From Fence Pickets

A handy wall rack for chisels and screwdrivers can be made by fitting tapered blocks, which might be cut from discarded fence pickets, between two pieces of plywood, as illustrated. The blocks are spread far enough apart to accommodate the blades of the tools. Such a rack is especially handy when mounted on a wall over your wood-turning lathe, as it keeps all the turning chisels at hand, makes selection easy and allows the chisels to be put back in place. —Morris Scott Dollens, Los Angeles, Calif.



Cans Assembled With Bolts Make Small-Parts Tray

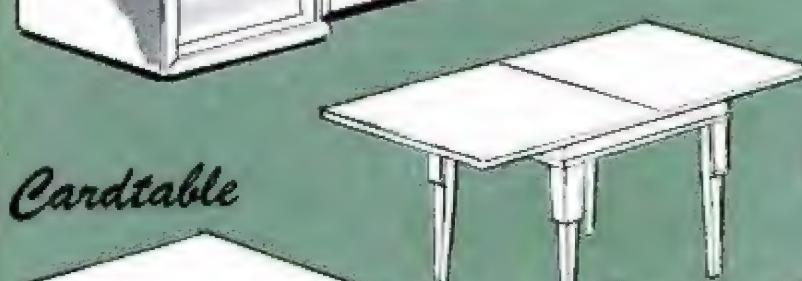
Using four or more empty cans of a suitable size and shape, you can assemble a handy small-parts tray in a few moments. Punch holes through the sides of the cans near the top with an awl or ice pick, and then fasten the cans together with small nuts and bolts, as shown. A handle can be made by bending a length of $\frac{1}{4}$ -in. brass rod, flattening the ends and drilling them to permit bolting them between the cans. If desired, the outside of the cans may be painted or covered with a decorative paper.



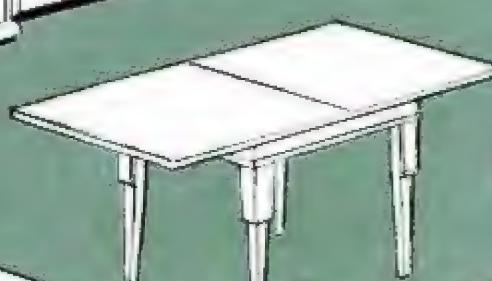
the POPULAR MECHANICS CRAFTSMAN



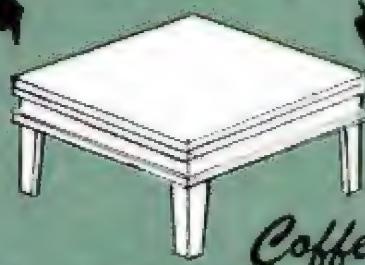
Folding-Bed Cabinet



Cardtable



Dining Table



Coffee Table



By John Bergen

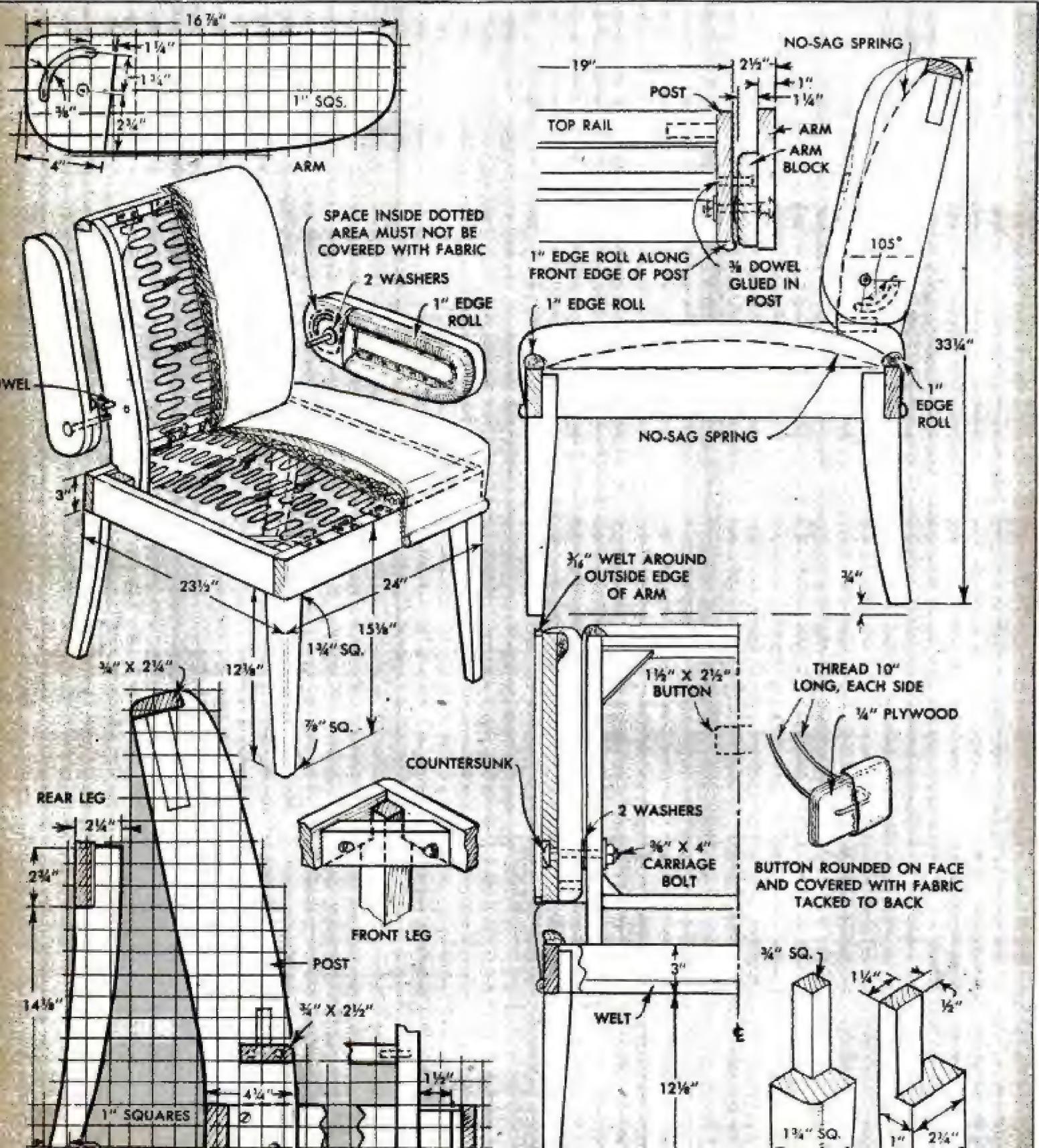


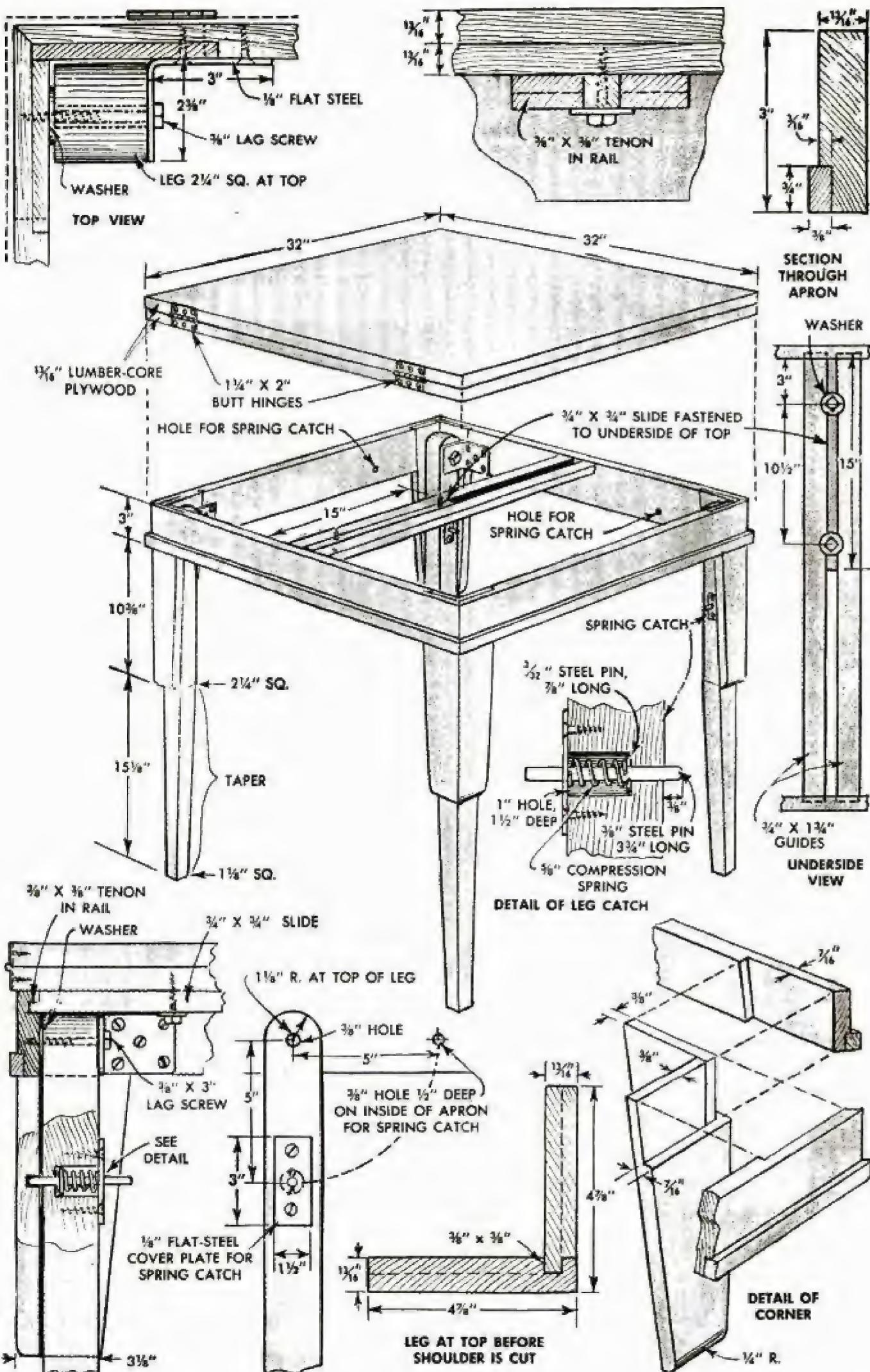
Sectional Chair

FURNITURE for ^{WIM '55} MODERN LIVING

FURNITURE DESIGNED for modern living is keyed to simple beauty, utility and convenience. The three pieces of furniture shown on these pages achieve these aims to a high degree, and in the matter of utility, go far beyond them. For example, the sectional chair with its movable arms may be used in four ways—the left arm down, the right arm down, both arms down or both arms up—depending on how you wish to arrange your furniture. And two or three can be placed together to make a sectional piece if your room arrangement requires it.

As a unit of multiple-use design, the





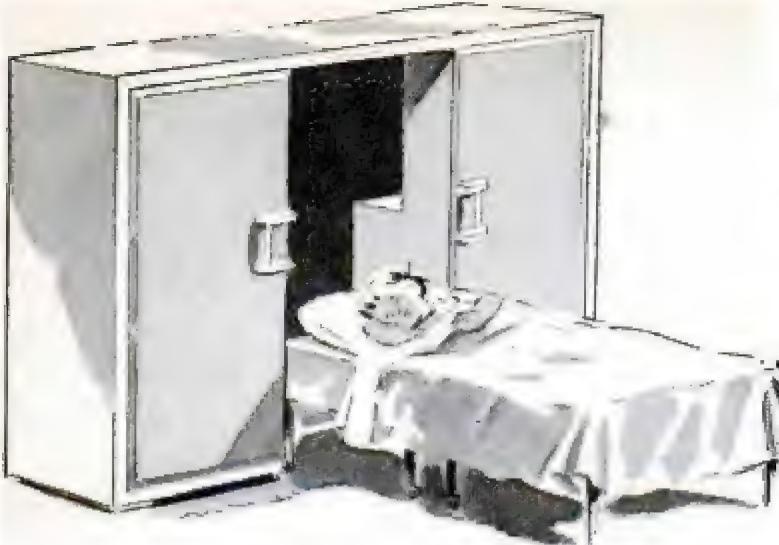
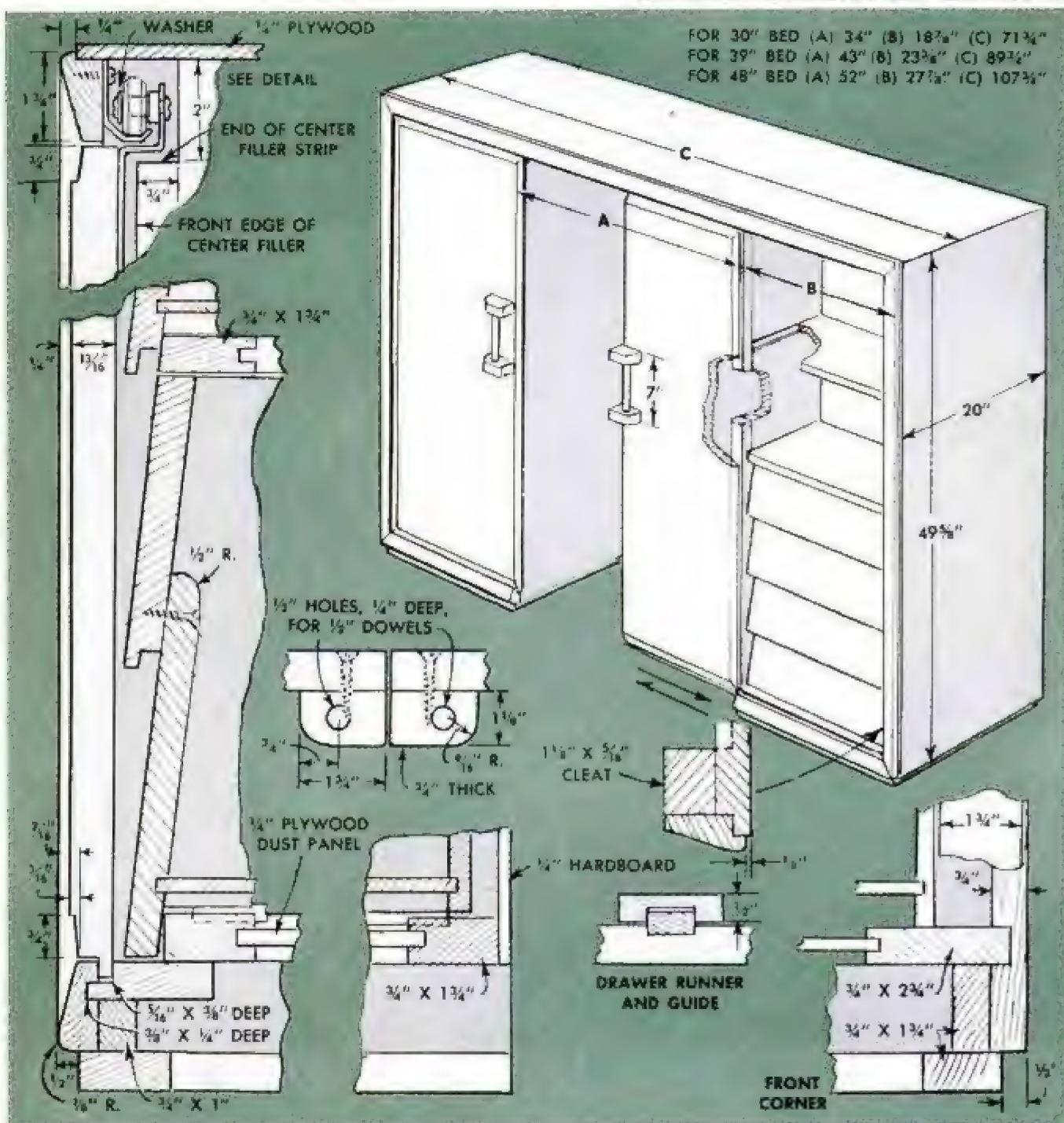


table is unsurpassed. With the legs folded, it is a low coffee table of smart appearance. When the legs are extended and one segment of the top is used, it becomes a fine utility or card table. And when the two segments of the top are spread out, it serves as a dining table. The outstanding feature of the table is the fact that through all these changes it maintains its lines of simple beauty, a rare thing in any convertible piece of furniture. The third item for modern living shown here is the folding-bed cabinet. In rooms where space is at a premium, the cabinet permits the use of a folding bed, and provides space in which to store the bed out of sight during the day. In addition, the cabinet features shelves and drawers to



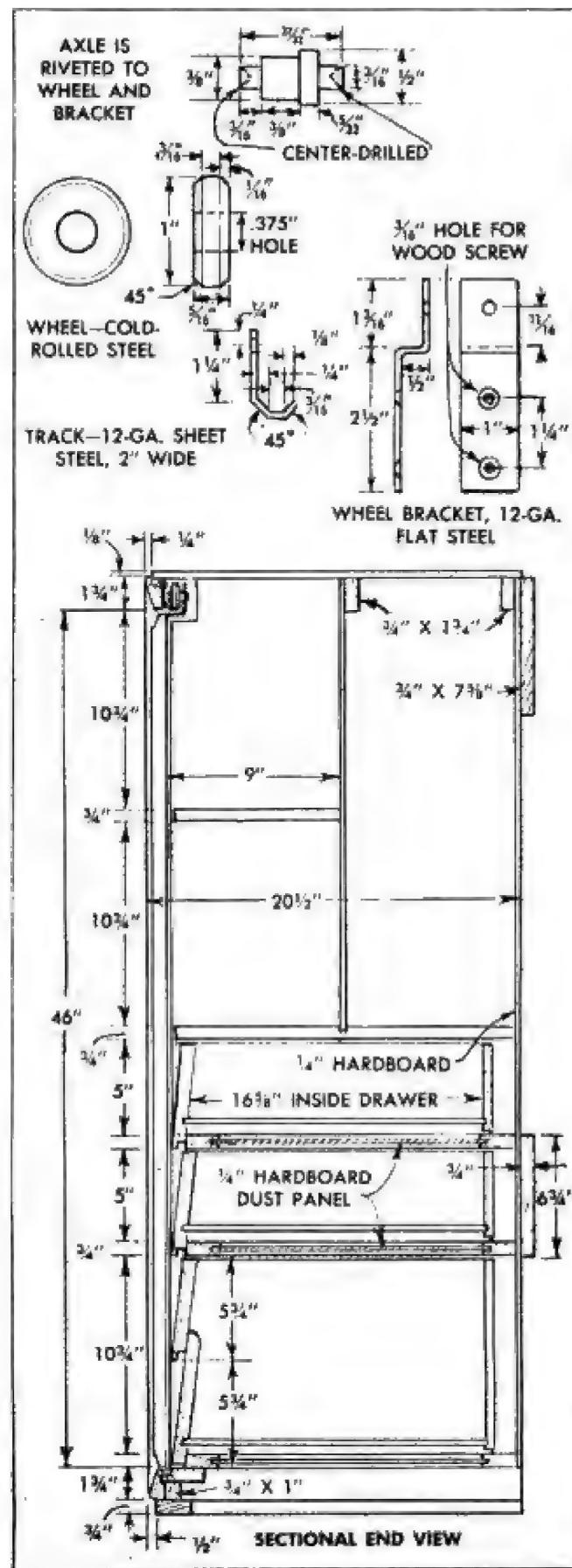
increase the available storage space in the room. All in all, it is an ideal unit for converting a small room into a much-needed bedroom.

The construction of the chair is begun by assembling the frame of the seat. Then the legs are shaped as shown and attached with glue and screws. Corner braces, screwed to the inside of the seat rails, are used to give rigidity to the front legs, while the back legs are braced by the sides of the chair back. Note the 1½-in. filler block at each rear leg. After the frame is completely assembled, the arms are made, but not attached until after the chair is upholstered. Be sure to leave the fabric on the back loose until the arm is bolted in place. A dowel pin that rides in a semi-circular groove limits the movement of the arm. Now sagless-type springs are tacked in place on the frame and the upholstery work is started. The plans show those places where edge rolls are required and indicate the proper size to use. After they are in place, the springs are covered with burlap, and then a layer of curled hair is random-stitched to the burlap. A layer of cotton padding is placed over the hair, and finally the fabric which has been selected as a covering is put on. No padding is used in upholstering the side panels of the chair back, and you must be careful to see that nothing interferes with moving the arms.

Details for the construction of the table are shown on page 199. The table frame and the short legs are assembled first, then the extension legs are attached. These legs are rounded at the top and pivot on a lag screw driven through an L-shaped, strap-steel brace. To lock the extension leg in the vertical position, the spring catch mounted in it engages a hole in the short leg. To lock it in the horizontal or folded position, the spring catch engages a hole on the inside of the table rail. To permit the table to be used as a dining table, the top is fastened to a slide, as shown in the detail. The slide unit consists of two $\frac{3}{4}$ x $1\frac{3}{4}$ -in. guides housed in opposite side rails with a mortise and tenon. Fitted between these is a $\frac{3}{4}$ x $\frac{3}{4}$ -in. slide, 15 in. long. This slide is screwed to the bottom of the table top, large washers being used with the screws to lock the table top to the under-frame. The slide is attached to the table top on the side near the hinged edge, so that when it is shifted to the other side, the hinged portion will be in the center of the table. Thus, when the table segments are opened, no additional supports are needed.

The folding-bed cabinet is designed to accommodate a rollaway-type bed. Since these beds are generally manufactured in three sizes, the proper dimensions for a cabinet to take care of each size are given.

An unusual "siding" effect is used for the drawer fronts, to add to the attractiveness of the cabinet. The sliding doors are hung on overhead rollers, which you can make yourself from the detail, or which may be purchased. The handles for the doors are blocks with $\frac{1}{2}$ x 6-in. dowels fitted between them. Cabinet plywood should be used for the exterior of the cabinet. ★ ★ ★



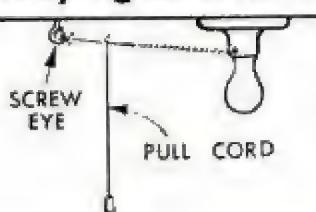


Large Block for Sanding Panels

To simplify the sanding of large pieces of work, such as plywood panels, use a sanding block like the one shown. Cover a wooden block 4 in. wide and 18 in. long, with sheets of sandpaper, stretching the sheets firmly across the bottom surface and tacking them to the sides. Use the block with a circular motion and even pressure. To prevent uneven finishing of the surface, the block should be held at the center.

M. B. Birge, Hinsdale, Ill.

Fraying of Pull Cord Prevented



Frayed and broken pull cords on electrical light fixtures can be prevented if the pull cord is suspended from a screw eye

as shown. When rigged in this fashion, the pull cord does not come in contact with any wearing surface. It also permits a direct sideward pull on the switch.

B. J. Wakeland, Davenport, Iowa.

Tumbling Toy From Capsule

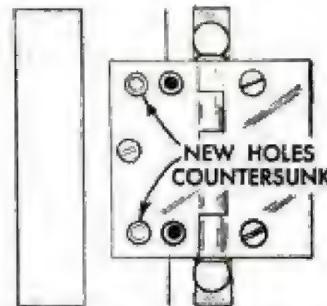
A tumbling toy like those that fascinated children years ago can be made by inserting a steel ball bearing into a gelatin capsule. The capsules can be obtained from any drug store, and the ball bearing is of the type found in any roller-skate wheel. After placing the ball in the larger half of the capsule, moisten the smaller half and insert it into the larger half. The moisture softens the gelatin and causes the two halves of the capsule to stick together.

Andrew Vena, Philadelphia, Pa.

Loose Hinges on Old Doors Fixed by Boring New Holes

Doors in an older house, where the trim is brought flush with the jamb, often have hinges fastened to the jamb so that two of the screws are located directly on the joint between the trim and the jamb. When these screws come loose, causing the hinge to wobble, a satisfactory repair can be made by drilling and countersinking two new holes through the hinge to one side of the original ones, so that these screws can be redriven into solid wood. The third screw, if it also is loose, can be replaced with a slightly larger one.

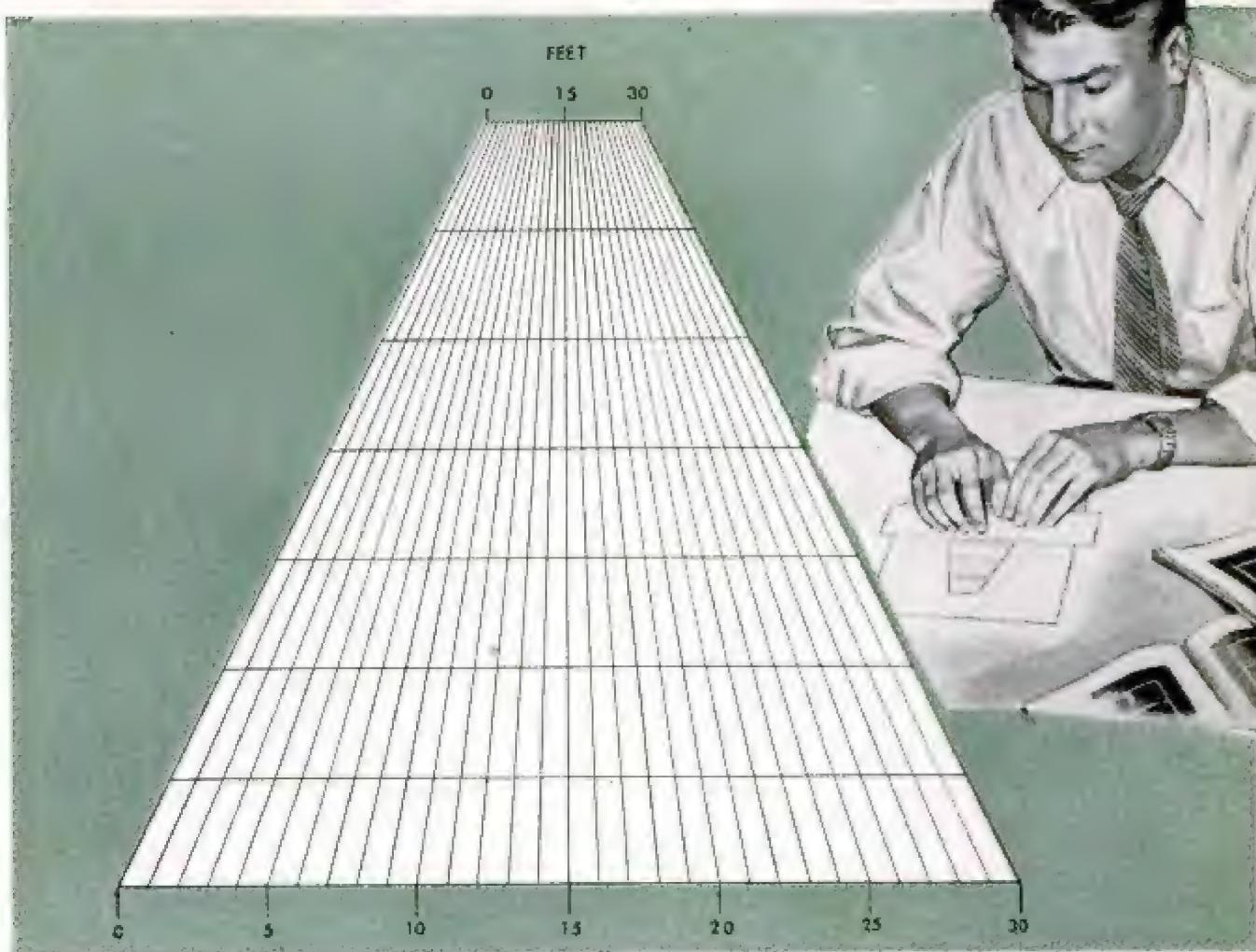
J. Howard Cooper, Philadelphia, Pa.



Lathe Helps in Adding New Line To Deep-Sea Fishing Reel

When splicing line onto a deep-sea fishing reel, it is best to put the new line on first, after taking the old line completely off the reel. Removing the old line is easy if you use a lathe. First mount a 6 or 8-in. length of 1-in. dowel between centers and tie the end of the line to it. Set the reel for a slight drag. If a wood lathe is used, start it at its slowest speed. Hold the reel in one hand and place the other on the lathe switch, ready to cut off the power in the event of a snarl in the line. After the old line is unwound, attach the new line to it and wind it onto the dowel also. Finally, remove the dowel from the lathe and place it in a box or pail to prevent it from rolling around, and rewind the spliced line onto the reel.—Ed Widdis, La Crescenta, Calif.

Scale Measures Floor Plans



MOST FLOOR PLANS that appear in magazines give the dimensions of the principal rooms, but often do not give those of halls, closets, patios and other features. With a "ruler" in the exact scale of the house, this information can be had simply by measuring directly on the magazine plan. To make such a ruler, select a given dimension on the plan, such as the length of one wall of the living room, and mark it off on a strip of paper. Let's say it is 20

ft. Locate the right-hand mark on the 20-ft. index at the bottom of the scale shown above, and then slide the strip of paper up the scale on the 20-ft. line until the left-hand mark coincides with the zero line. Now complete the ruler by making a mark on the strip where each line of the scale intersects it, each mark representing 1 ft. For measurements of less than a foot, you can interpolate on the scale.

Elmer L. Goodwin, Orlando, Fla.

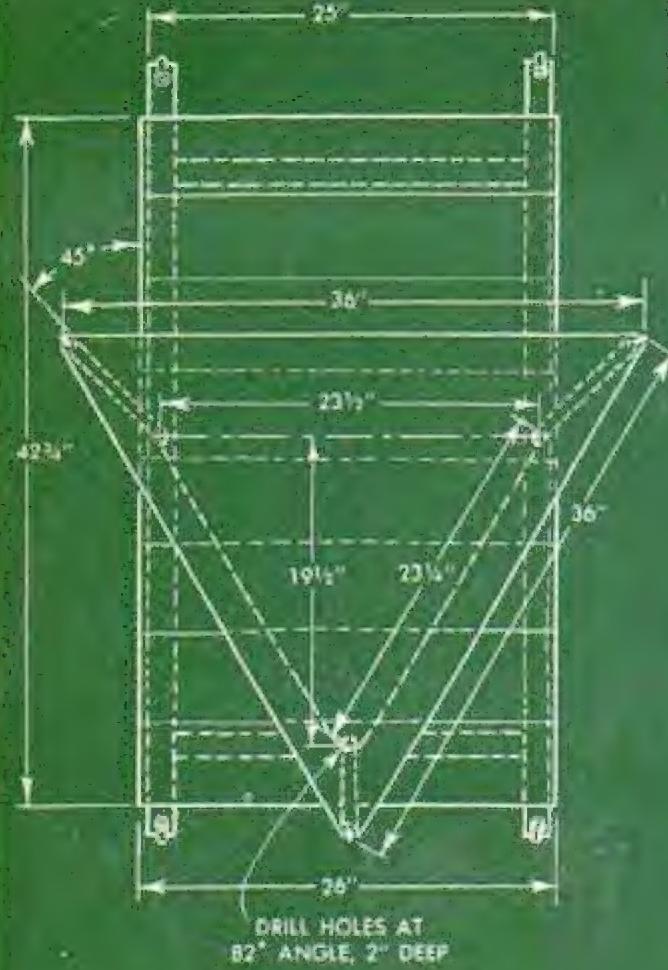
1434 Hamlin Ave.

Wood-and-Felt Glue Applicator is Improvement Over Brush

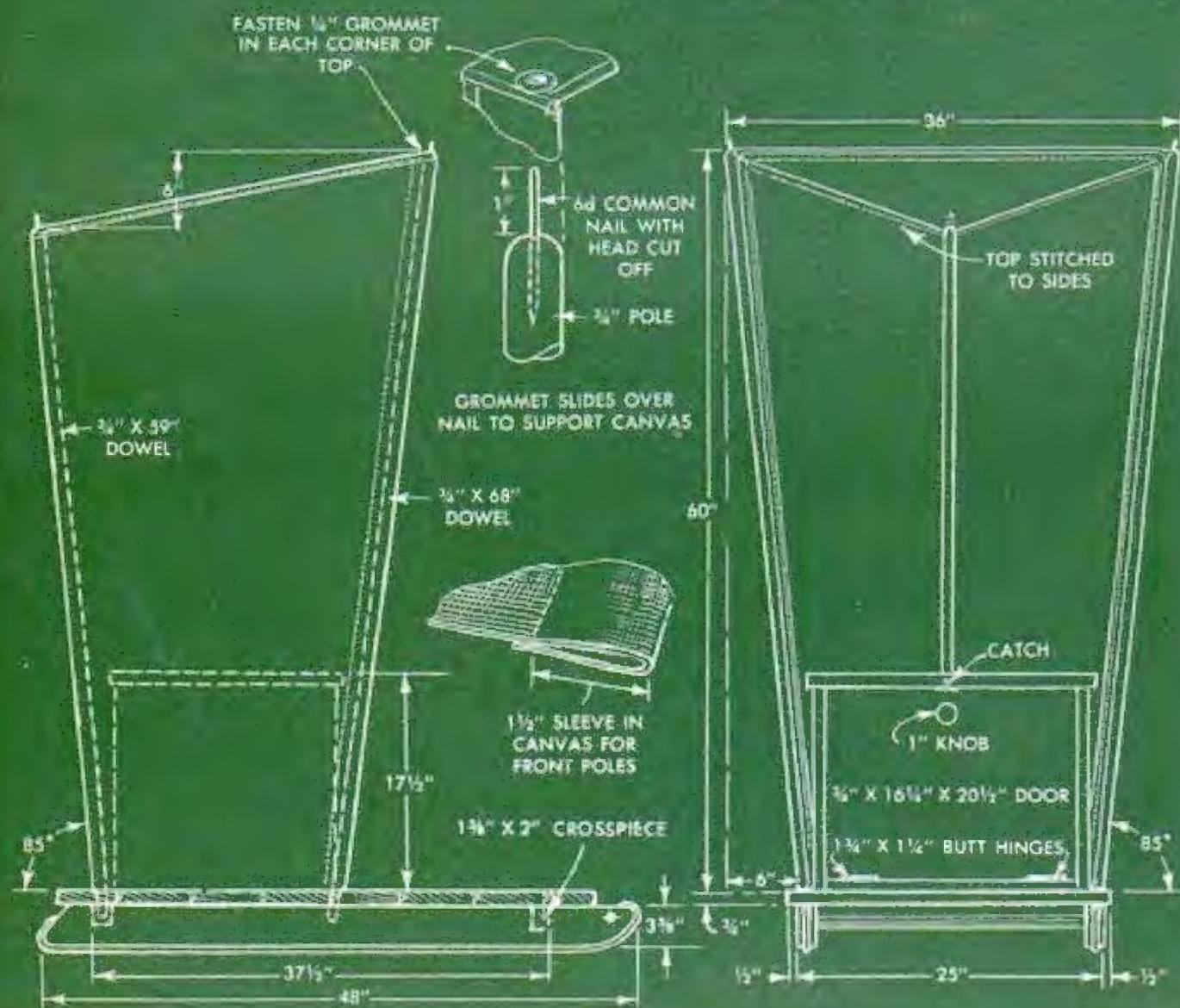


A liquid-glue applicator that deposits a thin, even film can be made by folding three or four strips of felt over the end of a thin piece of wood and binding them with a rubber band. An ordinary tongue depressor is ideal for this purpose, and strips of heavy flannel can be used if felt is not available. The applicator soaks up the glue and serves as a reservoir so that it need not be dipped frequently. Since the applicator costs so little to make, it can be discarded after use. However, if you want to save it, clean it by removing the felt and squeezing it out under running water.

PLAN of the MONTH ...



Ice-fishing enthusiasts will tell you that there is no sport in the world like it. That question may be argued, perhaps, but there is no doubt that ice fishing is a popular sport. If you're one of those who has tried it, you'll recognize the practical value of the shelter shown on these plans. And if you're a novice about to take up the sport, we would advise you to consider building this shelter. You'll appreciate the protection it affords on a wind-swept stretch of ice-bound lake. By facing the back of the hood into the wind, you can keep quite comfortable, and a gasoline lantern or small stove placed under the seat will provide some heat. The straps at the side of the sled will hold the folded canvas hood and also your fishing rods while you are traveling to and from the lake. If the winds are strong, the shelter should be anchored to a spike driven into the ice. Note that before using this shelter you should check your state conservation laws. While this design is legal in most states, you may have to alter it before using it in some areas. Some states permit no ice-fishing shelter at all.



Ice-Fishing Shelter

Material List

Fir or Pine

- 2 pcs.—2" x 4" x 48"—Runners
- 1 pc.— $\frac{3}{4}$ " x 1 $\frac{1}{4}$ " x 10"—Cleats
- 2 pcs.—1 $\frac{1}{8}$ " x 2" x 21 $\frac{1}{4}$ "—Spreaders

Tongue-and-Groove Pine

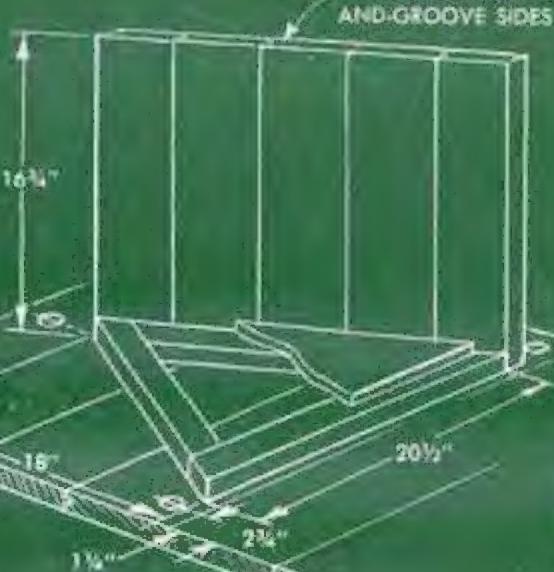
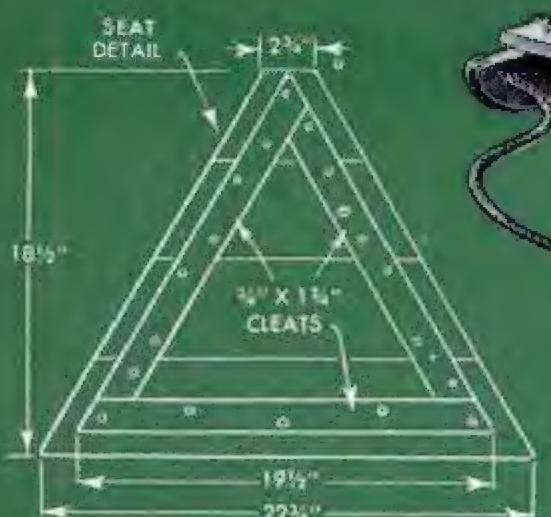
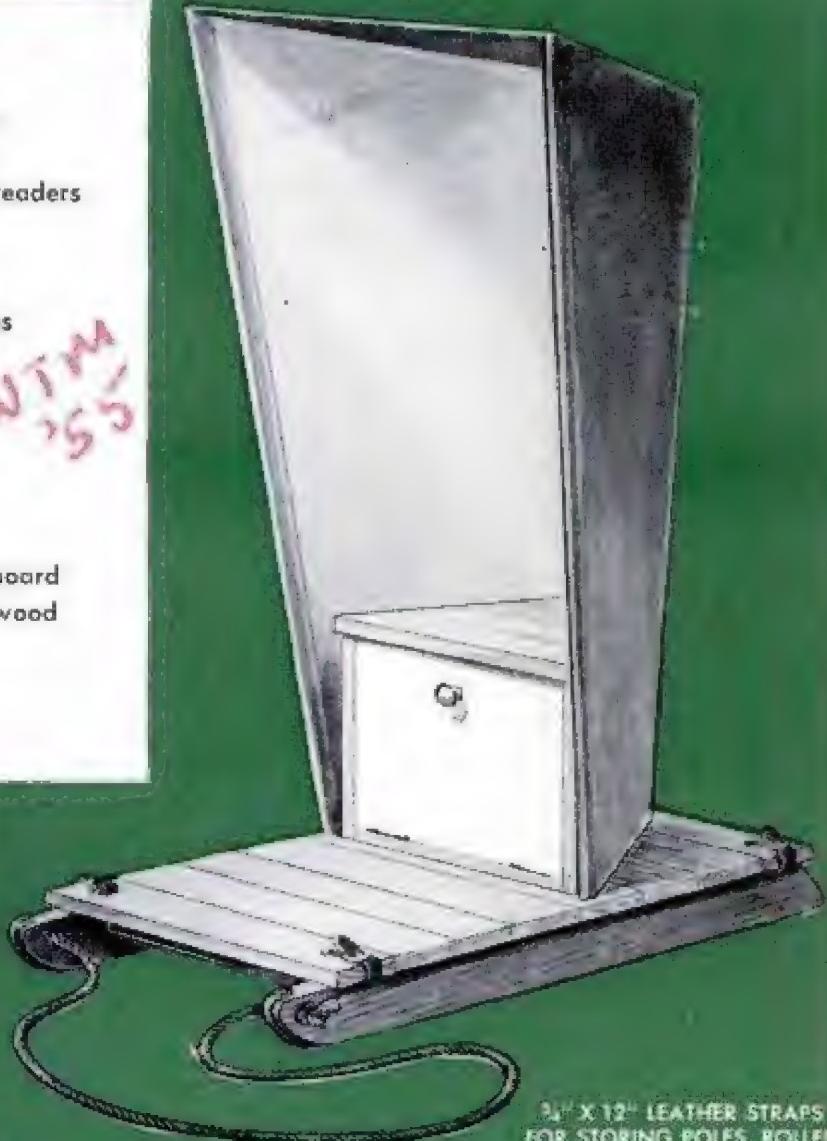
- 1 pc.—1" x 6" x 20'—Flooring
- 1 pc.—1" x 6" x 14'—Seat sides
- 1 pc.—1" x 6" x 6'—Seat

Hardwood

- 2 pcs.— $\frac{3}{4}$ " dia. x 68"—Poles
- 1 pc.— $\frac{3}{4}$ " dia. x 59"—Pole

Miscellaneous

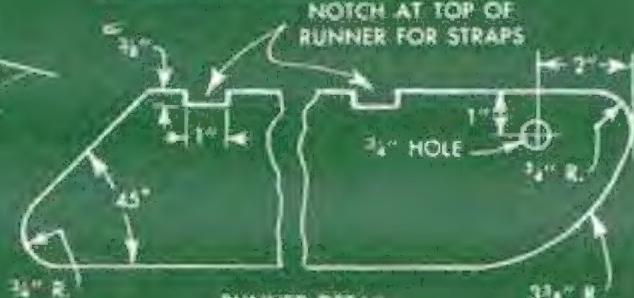
- 1 pc.— $\frac{1}{4}$ " x 17 $\frac{1}{4}$ " x 20' Hardboard
- 1 pc.— $\frac{3}{4}$ " x 16 $\frac{1}{4}$ " x 20 $\frac{1}{2}$ " Plywood
- 2— $1\frac{1}{2}$ " dia. x 5' Steel runners
- 4— $\frac{3}{4}$ " x 12" Leather straps
- 6 yd.—27" wide canvas



HOLES CUT IN FLOOR FOR STRAP



NOTCH AT TOP OF RUNNER FOR STRAPS



RUNNER DETAIL

W.
T.
M.
55

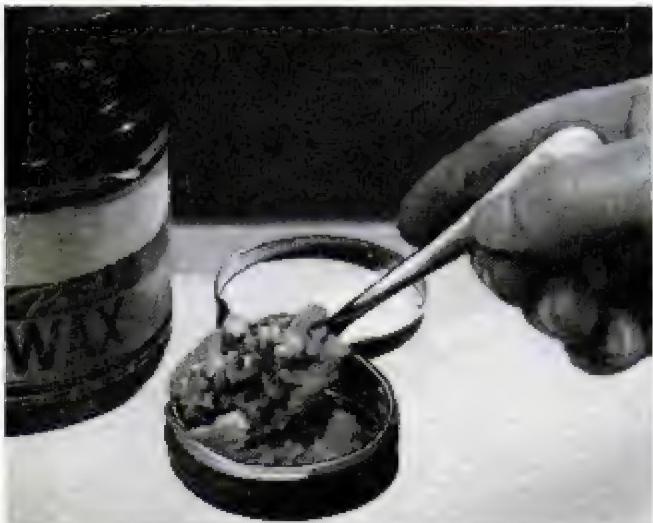


Grooved Block Holds Plywood For Easier Sawing

When cutting a sheet of plywood with a handsaw, you can prevent vibration and pinching of the saw by holding the plywood with a grooved block. After starting the saw cut, slip the block over the edge of the plywood, as pictured, so the groove engages the sections of the panel on both sides of the cut. To be most effective, the groove should be a snug fit over the plywood and at least $\frac{1}{2}$ in. deep.

Wax Kept in Glove Compartment Permits Polishing of Trim

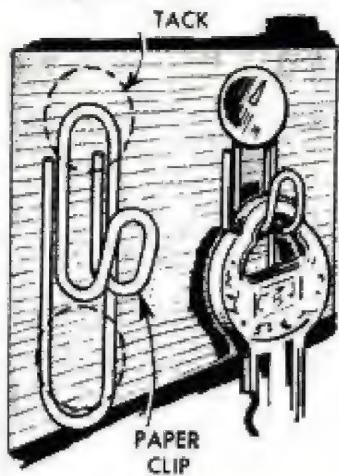
While you're waiting in the parked car for your wife to return from shopping, polish the interior trim. This is a worth-while way to kill time while waiting, as keeping a coat of wax on the instrument panel, door handles and window trim will not only preserve the finish but make dusting the interior considerably easier. So you'll be able to polish the trim whenever the opportunity presents itself, keep a shoe-polish can filled with wax in the glove compartment. A small pad of cheesecloth is stored in the can as an applicator and a soft polishing cloth may be wrapped around the can.—W. H. McClay, Pasadena, Calif.



Hang Keys on Handy Hook

A light wall hook for keys and other small objects can be made by bending a paper clip as shown in the detail. The bend may be made easily if a needle-nosed pliers is used. The hook then is attached to the wall with two thumbtacks. An excellent key-storage board can be made by fastening a number of these hooks on a panel, which is then hung in a convenient place.

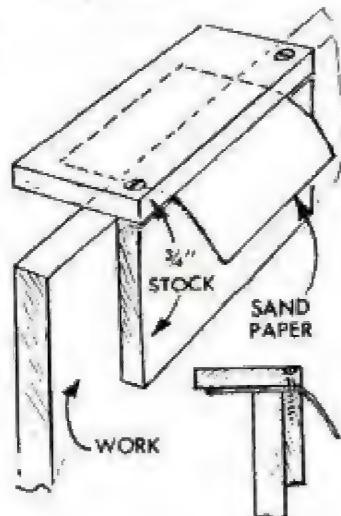
Frank Shore, New York City.



Jig to Sand Edges Square

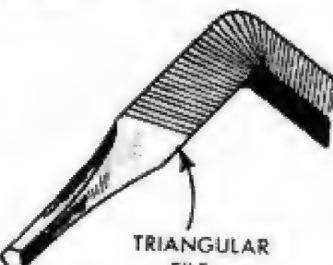
Sanding the edges of boards so they remain true and square is easy if you use this sanding jig. It consists of two boards screwed together at right angles, with a piece of sandpaper clamped in place at the joint. To change the sandpaper sheet, simply loosen the screws slightly, pull out the old paper and feed in a new sheet. In making the jig, care should be taken to see that the two boards used are exactly at right angles to each other.

Marvin Reid Hartley, San Diego, Calif.



Emergency Socket-Head Wrench From Three-Cornered File

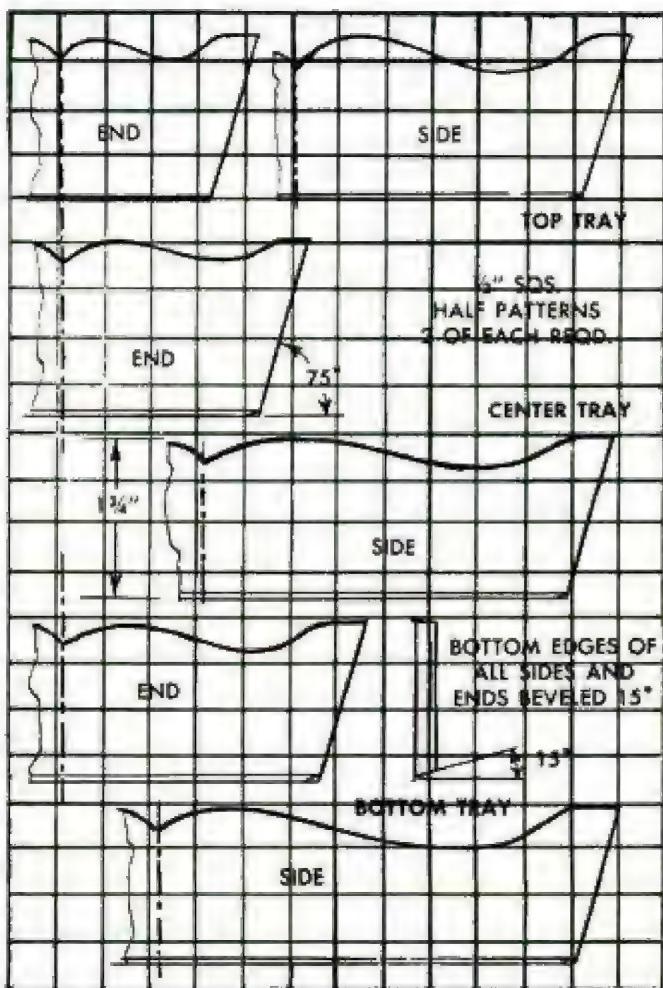
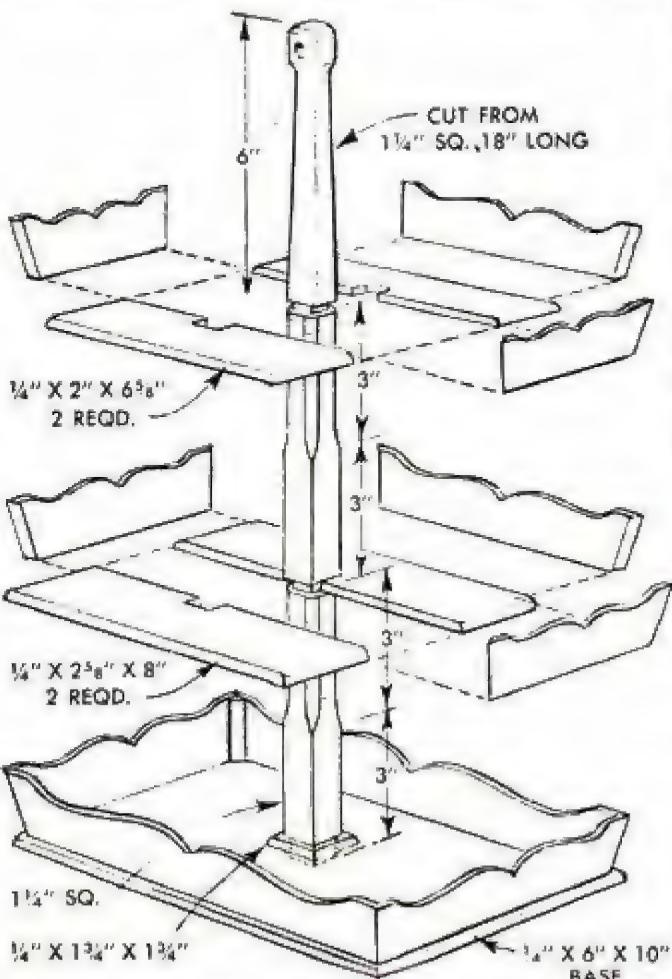
An emergency socket-head wrench can be made quickly from the tang of an old three-cornered file. As the hex-shaped tang tapers, it is first cut off at the point which will provide a wrench of the proper diameter. Then the file is heated red-hot and bent into an L-shaped handle, as shown. To restore the temper to the file, reheat to a cherry-red and then quench it in cold water.



3-TIERED SNACK TRAY

By Bertram Brownold

This attractive tray for fruit, candy, cookies or flowers stands 18 in. high and serves as an interesting table centerpiece. The standard is of 1½-in.-sq. stock and each tray is of ¼-in. plywood or solid stock. Sides and ends are cut according to the squared pattern. Note that standard is tenoned at the lower end and grooved at 6-in. intervals to take notched tray bottoms. Tray side and end pieces are beveled along the lower edges and the corner joints are mitered. Ring handle is made of twisted wire

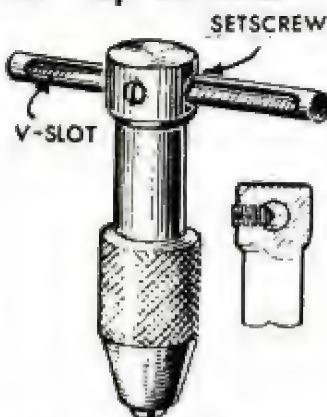


Oarlocks Inserted in Sawhorse Hold Pipe for Cutting



Workmen who find it necessary to cut lengths of pipe, drapery poles and other similar round stock, will find that a pair of open oarlocks mounted on a sawhorse can be used as an effective cradle to hold the pieces for cutting. The oarlocks are inserted in holes drilled in the top of the sawhorse, and can be removed quickly when desired.

Setscrew Holds Handle Of Tap Wrench



To prevent the handle of my tap wrench from sliding to one side while in use, I milled a slot in it, then drilled a hole in the side of the wrench and tapped the hole to receive a setscrew. Tightening the setscrew in the slot holds

the T-handle in any desired position and increases the efficiency of the wrench considerably.—R. M. Woodbury, Natick, Mass.

Cutting Small Rods Squarely

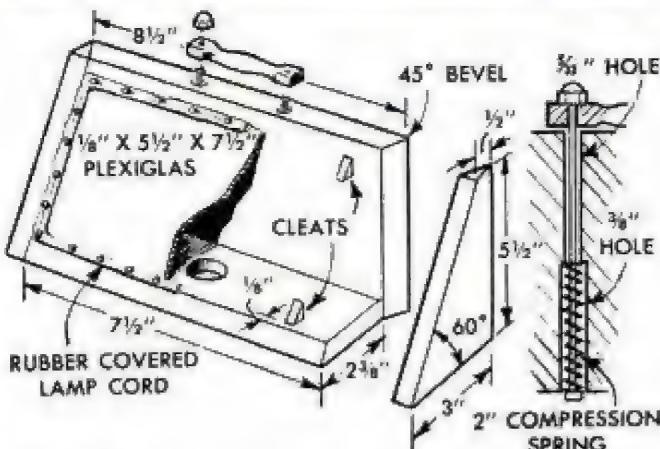
One craftsman finds that his drill press simplifies the job of cutting pipe and small rods squarely with a hacksaw. One end of the work is chucked in the drill press, with the other end extending down through the drill-press table. The drill press is then belted for low-speed operation and the hacksaw laid flat on the table. After start-

ing the drill press, the hacksaw is held against the rod or pipe with just enough pressure to keep the teeth cutting.

John A. Comstock, Wellsboro, Pa.

Photograph Mounted on Plastic Decorates Novel Doorstop

Using sand for weight, this decorative doorstop is easy to handle. The detail gives all necessary dimensions for its construction. Either hardwood, such as walnut or mahogany, or softwood stained to simulate hardwood, can be used. The handle is spring-loaded, so that it is out of the way when not needed. The photograph mounted under the Plexiglas should be an enlargement on single-weight paper. First, it is soaked in water until limp, and then dipped in gelatin well dissolved in water and having the consistency of cream. It is then



placed face down on the Plexiglas and squeegeed until all the bubbles are out. Very heavy weights are placed on it until it is dry. Rubber-covered lamp cord, available in a number of colors, is used as a molding to hold the Plexiglas in place after it is mounted in the doorstop. After the doorstop is completely assembled, it is filled with sand through the hole in the bottom, which is then plugged and sealed.—Theodore K. Hastings, Los Angeles, Calif.

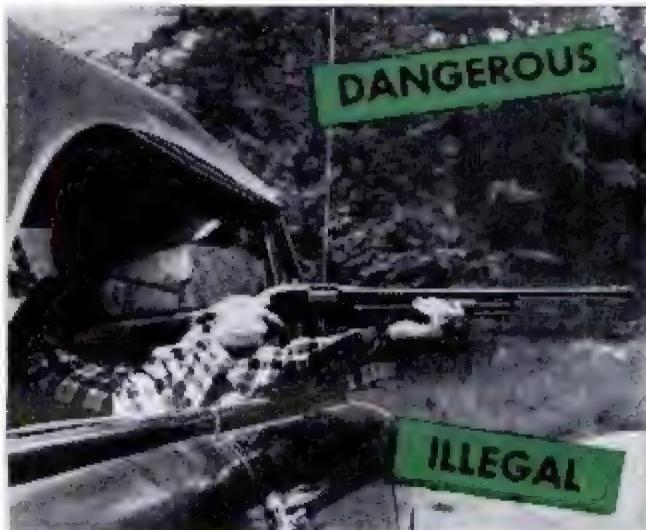
After some use, a setscrew threaded into hardwood will begin to loosen in its hole. One or two coats of shellac applied to the threads when this happens will give the screw a snug fit once again.



THIS FALL, the National Safety Council predicts, hundreds of hunters will "bite the dust" along with their furred and feathered friends. Many of these hunters will rise again with only minor wounds, but others will not be so fortunate. The photographs on these pages, prepared with the cooperation of the New York State Conservation Department, illustrate what to do and what not to do, depending on whether or not you want to return home. In addition to the "do's" and "don'ts" shown in the photos, here are a few important rules to keep in mind. Never look down the barrel of your gun. Don't go hunting in cowboy-type boots having high heels, as you are likely to trip. Don't stick a gun barrel in the snow—it might explode the next time you fire it—and don't move around in a boat while carrying a loaded gun. Playing with the hunting dogs while you're holding a loaded gun, also is dangerous. Never climb a tree with a loaded gun—chances of accidentally discharging the gun are excellent. Finally, remember that gunpowder and alcohol don't mix. ★★★

Guns make comfortable but unsafe leaning posts. The pose in the picture at the right will keep dust out of the barrel, but may put holes in the hunter

Shooting from a car is not only unlawful in most states, but also unsportsmanlike and very dangerous. Anyone walking near the road is in jeopardy





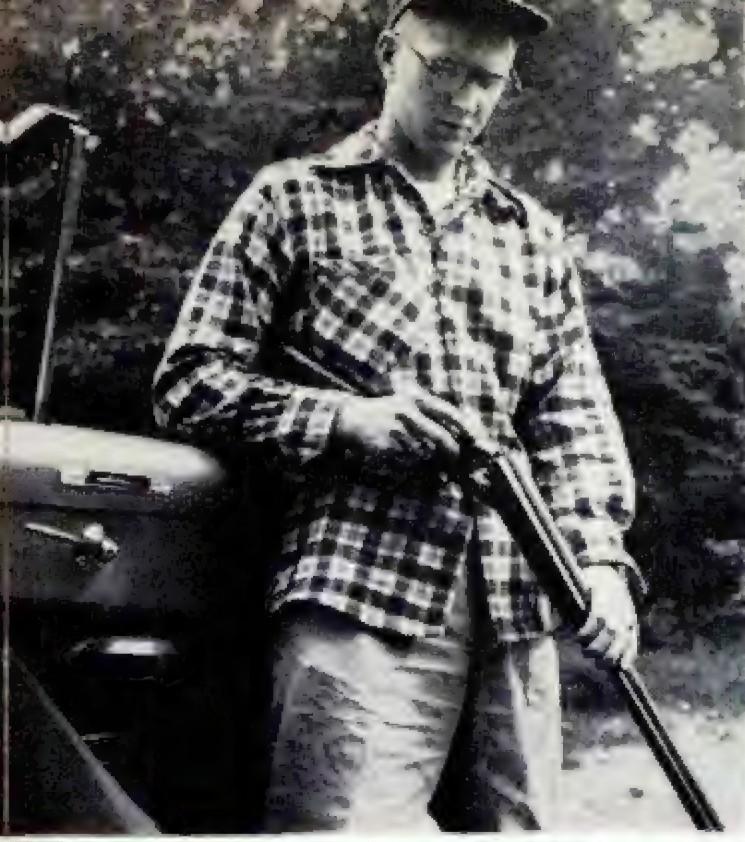
You'll get home

Left, the safety catch is put on a gun to prevent accidents. Use it. Upper left, when another hunter approaches, it is wise to break open gun as an extra safety factor. Above, game warden advises hunter to keep his finger off the trigger until he is ready to fire—and also tells him never to point the gun at any living thing unless he intends to shoot

Lower left, don't put a loaded gun into a car at any time. And even if you think the gun is unloaded, don't point it at yourself as this Nimrod is doing. The reason should be obvious. Below, this man is using his gun as a lever to pry up some logs. Used in this fashion, gun is excellent lever for lifting yourself into eternity. Best advice is, don't

It's doubtful





like this

Here is a wise hunter who intends to be around when the seasons open for years to come. Before getting into his car he breaks gun and unloads it. Then he can be sure that the jolting of the road won't cause the gun to fire unexpectedly—and he knows that if the trigger should catch on some of the equipment in the back seat, no one will get hurt.

The question raised in the photo below seems to be, which of these two hunters will last the longest. Each has his gun pointed at the other. After examining the picture, we're betting that the man in the checkered shirt will be the first to go. His friend is doing some interesting calisthenics with his gun that are practically guaranteed to kill somebody.

this way!

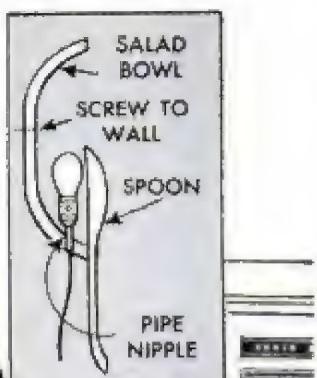


It has been said that more hunters are shot climbing fences than at any other time. The man above will be around to get his limit today because he knows how to climb a fence. First he breaks and unloads his gun, then pushes it under the fence. Then he climbs the fence. This method takes a little longer but saves wear and tear on the hunter.

"Look, Ma, no hands." And the man at the left in this picture will soon be saying, "No head, either." Climbing shaky fences and stone piles with a loaded gun is an invitation to disaster. If you slip, you may clutch the trigger or drop the gun. Hunting deaths may be called accidental, but such fatal accidents don't happen if the hunter uses his head.



Decorative Kitchen Wall Light Made From Spoon and Bowl



A different and attractive wall light to decorate a bare wall or dark corner of a kitchen, can be made from a wooden salad bowl, a wooden salad spoon and an ordinary light socket. A $\frac{1}{8}$ -in. pipe nipple is threaded into the light socket, and this assembly is inserted in a hole drilled through the side of the bowl, as shown. The nipple should be a tight fit in this hole. Place a 15 or 25-watt bulb in the socket, and then attach the spoon to the edge of the bowl with a screw, positioning it so the bowl shields the light bulb.

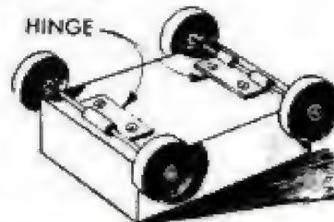
Buzzing in Electric Clocks Caused by Oil Lack

When an old electric clock develops a buzzing or grinding sound, it usually indicates lack of oil. Repairmen customarily replace the motor when this happens, which is expensive. A less expensive way to restore the clock is to oil the motor. Remove the back of the clock and drill an oilhole in the motor case near the magnet pieces that surround the armature. The hole should be in the top half of the case to make a spill-proof reservoir, using a $\frac{1}{8}$ -in. drill. Drill slowly to make sure you don't cut into the rotor. When the drill is about to break through the wall of the case, use an awl or ice pick to open the bottom of the hole. Pour mineral oil or fine gun oil into the hole. Pry the rotor back and forth with the pick to work in the oil. Plug in the clock and continue to work the oil into the hole, now using a toothpick to lessen the shock danger. The clock should be tipped to various positions to permit the oil to work into

the bearings. Finally, the hole is covered with waterproof adhesive or masking tape to keep out dust and to retard evaporation of the oil.—Dean Rossiter, Riverside, Calif.

Hinge Leaves Provide Bearings For Axles of Toy Wagon

The next time you are looking for a simple way to attach the axles to a toy wagon, take a loose-pin hinge apart and use the leaves as shown here. Where it is desired to pivot the axle, blocks are added under both axles and a washer is placed between the front block and the body to permit the axle to pivot freely.



House-Plant Watering Can

A watering can for house plants that enables you to control the amount of water applied to them and, at the same time, prevent spilling, is made by removing the bottom of a pressurized whipped-cream dispenser. In use, the dispenser is turned upside down and filled with water. A slight pressure on the nozzle of the can allows a small quantity of water to flow onto the plants.—George E. Bilhorn, Jr., Chicago.



During rainy weather a large desk blotter placed inside the front door provides an excellent mat for drying wet galoshes and rubbers.

It's No Trick to Install a Full-Length Door Mirror



Photos courtesy Pittsburgh Plate Glass Co.

A full-length mirror in the bedroom or hall of any home is a real convenience. To many homeowners the job of mounting such a mirror on a door may seem a formidable one, yet it actually is a fairly simple undertaking. The easiest method is to attach the mirror to the door by means of special plastic clips. The door is taken

down and a mirror slightly larger than the panels of the door is positioned on it. Then the clips are placed; two at the top, two at the bottom and several along the sides. After the clips are in place, the door is rehung and the job is finished. To make it even easier for the homeowner, complete packaged units are now on the market.

Sliding Rack in Deep Closets Provides More Storage Space

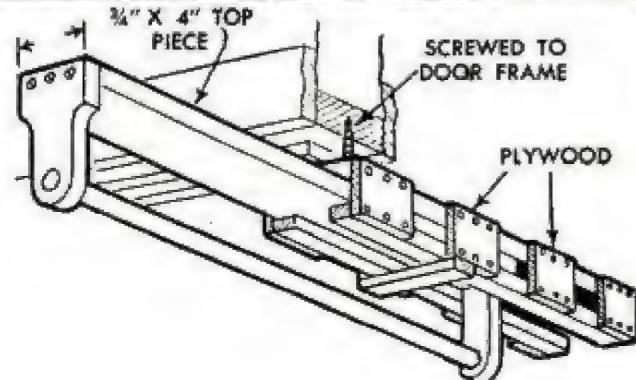
Utilizing all of the space in a deep closet, this sliding rack often will double available storage space. The "track" for the sliding section consists of a toppiece of $\frac{3}{4}$ -in. plywood, 4 in. wide, two slides, 1 in. wide and sidepieces of $\frac{1}{4}$ -in. plywood. The sliding section is made of a board $3\frac{1}{8}$ in. wide, two endpieces and a pipe or dowel clothes pole. The front endpiece is shaped as shown to clear the slides.

Clinton R. Hull, Costa Mesa, Calif.

Plug Valve Drainage Holes

One automobile mechanic saves time and trouble on valve grinding jobs by keeping an assortment of bottle corks at hand. Where the valve-chamber drainage openings are round holes, these corks are used to plug the holes before valve-spring washer locks are removed and replaced.

H. W. Swope, Danville, Pa.





Large sculptures can be made by applying the plastic metal over a hollow-core armature made of screen wire. Basic shape is formed by cutting the screen wire to shape and tying it together with fine wire



After the armature is completed, the joints are dabbed with the plastic metal. When this has dried, the entire form is given a coating of the metal, $\frac{1}{8}$ -in. thick. This should then dry for several days



Working With PLASTIC METAL

By Theodosia Carpenter

A PLASTIC METAL that can be thinned to a liquid, and yet hardens into real aluminum, is the latest product in the craft and hobby field. The uses of this metal are almost endless. When taken from the can, the material has the consistency of putty. It can be thinned for spraying or brushing, or it can be used as a putty for other types of work, such as sculpturing. Once it has hardened, the metal won't rust, can be sawed, carved or machined, and will not chip, crack, expand or shrink.

Sculpturing with this new product is done by applying the plastic metal to a hollow-cored armature (form) made of screen wire. Since you have a metal statue as soon as the last layer dries, the usual method of carving in clay, then casting in plaster and finally casting in metal is simplified. Another effective use of plastic metal is inlaying designs in wood. The desired design is traced on the wood, and then a groove is routed out along the traced lines. The groove is then filled with the plastic metal. The metal and wood are sanded at the same time when the metal has dried, and the result is a very attractive inlay.

Plaster statues can be made to look like metal castings by brushing on several

Features such as nose and mouth are built up in $\frac{1}{8}$ -in. layers, each layer being allowed to harden. Smooth surfaces, such as the face, are sanded and the piece is burnished with steel wool for luster





Metalizing baby shoes with the plastic metal is easy. The shoes are filled with plaster and allowed to dry. Then several layers of the plastic metal are brushed on. After drying, shoes are burnished

coats. It can be brushed or sprayed on materials such as canvas, cardboard, paper and leather to achieve a true metal finish. And it can be used to make metal trim for models of all kinds. Metalizing baby shoes and other mementoes of childhood with the plastic metal is easy. The surfaces of the baby shoes are cleaned, and then the shoes are filled with plaster. They should be allowed to dry for several days after the plaster has hardened. Then several layers of the metal are brushed on. When dried, the shoes are burnished and then mounted in book ends or used as desk ornaments. Plain wooden picture frames, with the metal applied at random looks like antique silver

To make this inlaid metal design, the pattern was first traced on the wood, and then routed out. The groove was filled with the plastic metal, and then the metal and wood were sanded to a smooth finish



Plaster statues, such as above, can be given several coats of the plastic metal for a beautiful finish. Below, a wooden picture frame with the metal applied at random looks like antique silver



Metal overlays are easy with the plastic metal. A mixture of metal, 1 part, and thinner, 1 part, is brushed over the lines of the design until they have been built up as high above surface as desired



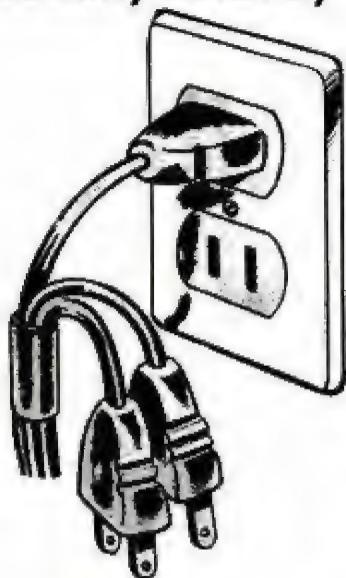
Pouring Spout for Paint Can Soldered to Lid



If you find that pouring paint from a can is a messy job, use a lid fitted with a pouring spout. To prepare the lid, which may be switched from one can to another, simply cut off the tail end of a cheap funnel and solder it over a hole cut in the lid near one side. Punch a vent hole on the opposite side. When using the lid, be sure it is pressed tightly in place, and clean it after each use.

William B. Eagan, Louisville, Ky.

Notches Filed in Electric Plugs Identify Cords by Touch



When several electrical plugs are grouped together for independent attachment to one wall outlet, the selection of the proper cord can be simplified by filing notches in the sides of the plugs. As each plug has a different number of notches, it is possible to identify the plugs by touch. This idea would be particularly

useful to a photographer, enabling him to select plugs easily in the darkroom without turning on a light.

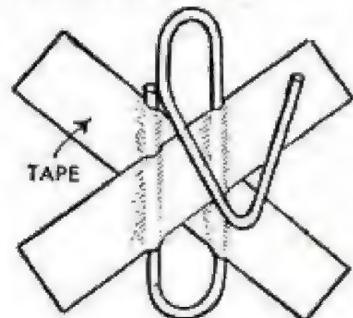
Removing Stains From Old China

Old pieces of china very often are spoiled in appearance by the presence of coffee stains in the hairline cracks of the glaze. To

remove these blemishes, make a paste of baking soda and apply to the stained areas. After letting it stand for about an hour, wash the pieces with soap and warm water. In cases of severe discoloration, this treatment may have to be repeated two or three times.—John Devlin, Merrick, N. Y.

Picture Hanger Without Nails

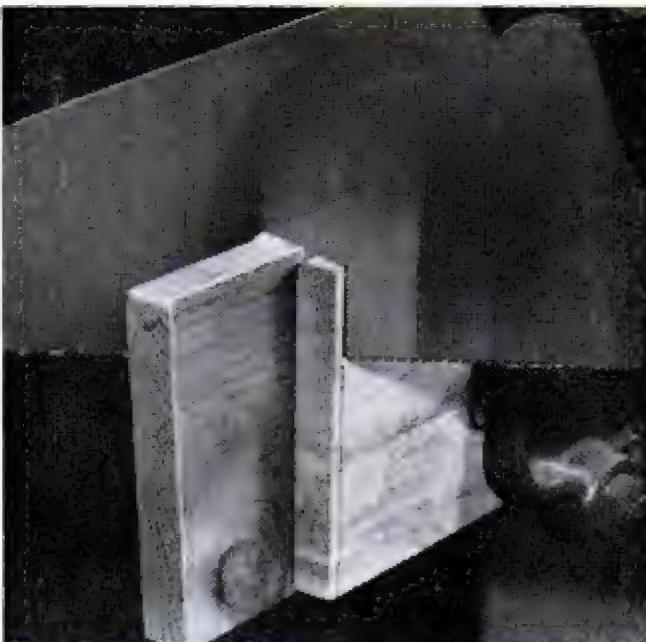
Taping a paper clip, bent as shown, to the wall provides a hanger strong enough to support most small pictures without the use of nails. Use painter's masking tape and, to make sure it will stick to the wall, momentarily hold a match under the adhesive side before applying it. This will make the adhesive more tacky. Then, use a smooth hard object, such as the underside of a teaspoon, to smooth out the tape after it is in place.—Norm Jacky, Fond du Lac, Wis.



Use Scrap Lumber Behind Board When Making Small Cuts

When it is necessary to trim $\frac{1}{8}$ or $\frac{1}{16}$ in. from the end of a board with a handsaw, an even cut can be made if a piece of scrap lumber is put behind the stock to be cut. Mark the line of the cut to be made, then clamp the two pieces in a vise to saw them. Smooth cuts that are otherwise almost impossible to make can be done this way.

Elmer Henning, Augusta, Ga.

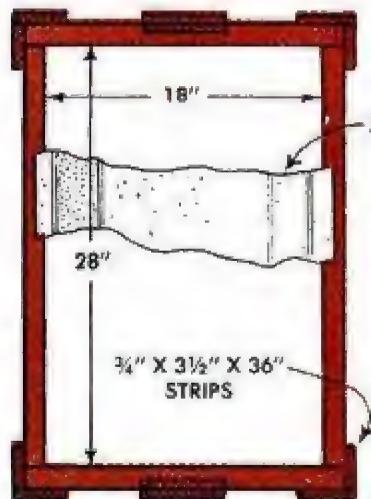


To improve the appearance of an asbestos-board ceiling over a heating unit, trim the edges with metal molding.

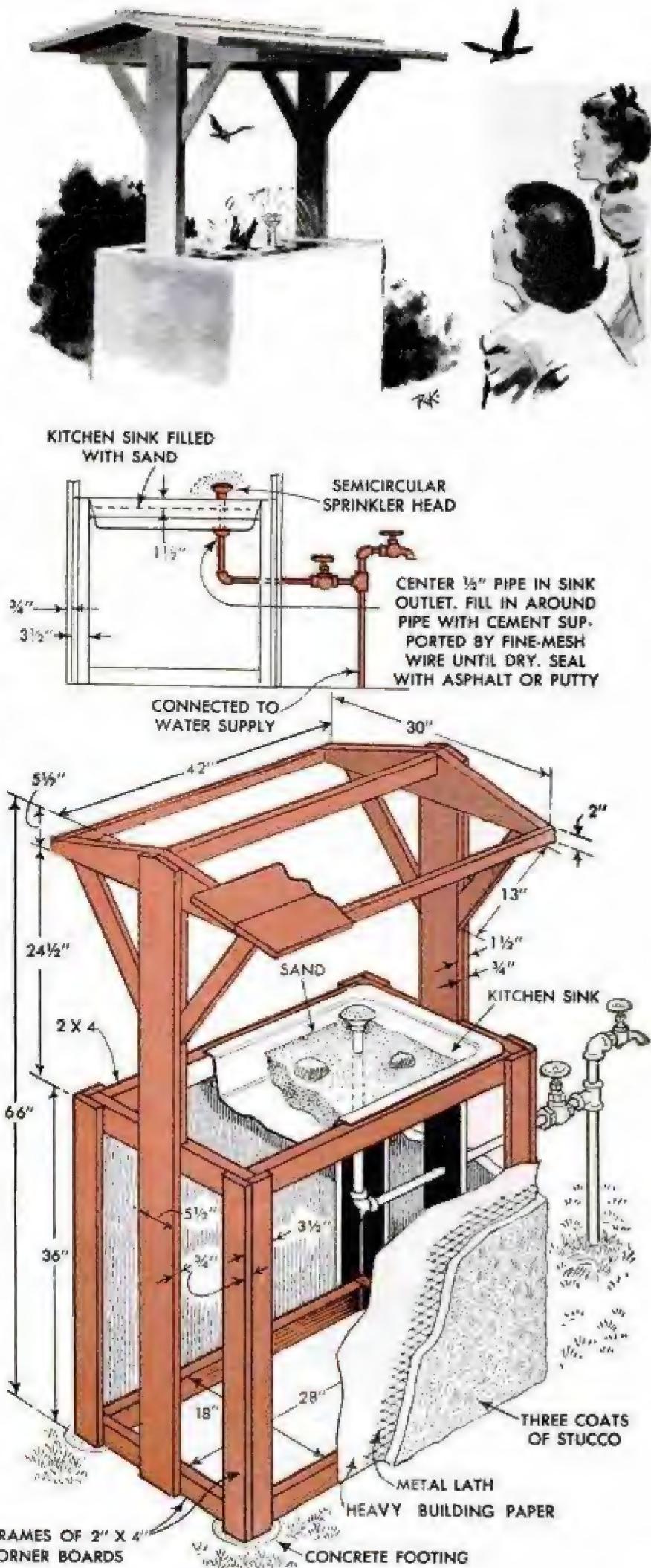
STRICTLY FOR THE BIRDS

By Dick Hutchinson

REPRESENTING a modern version of the old oaken bucket, this novel replica offers something different in the way of a sheltered birdbath for your lawn. Besides featuring a canopy to offer a shaded oasis in the hot sun, it has a built-in shower which is used to replenish the water in the bath. Construction is simplified in being centered around an old kitchen sink which serves as the "bathtub." An 18 x 28-in. sink was used in the original. If you wish, the birdbath may be connected permanently to a lawn water tap or water can be "piped" to it by a garden hose. A foundation for the stucco which covers the base of the birdbath is formed by wrapping the framework with heavy building paper and metal lath. Three coats of stucco are applied, consisting of a mixture of sand, 3 parts and portland cement, 1 part. The pipe which comes up through the sink is sealed with concrete, followed with a coat of asphaltum varnish. Fill the sink with enough clean sand to bring it $1\frac{1}{2}$ in. from the top, and place one or two large stones in the sand for the birds to alight on.



BUILD UPPER AND LOWER FRAMES OF 2" X 4"
STOCK AND JOIN WITH CORNER BOARDS





1



2

You don't need expensive equipment to shoot night-fire pictures. A box camera will do it, with careful handling. It's a good idea to have a flash unit handy for filling in foregrounds. If you forgot to bring a tripod along, a medium-sized box will serve

Shooting

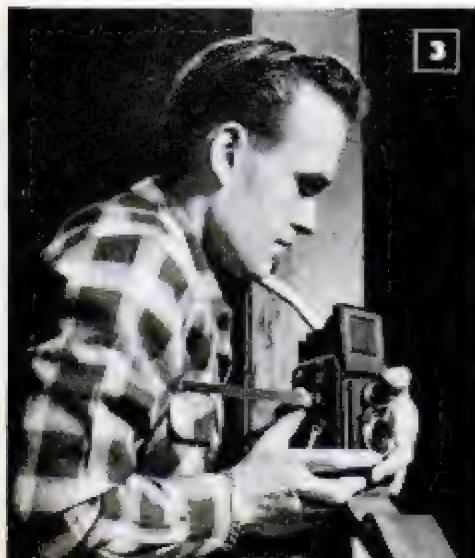
By Richard W. Emery

SHOOTING A BIG FIRE at night looks simple enough but roaring flames can be blinding even at a safe distance, and reflections may appear to light up the foreground and near-by objects in daylight detail. Because of this, inexperienced photographers can be fooled into making an ordinary daylight exposure. When the film is developed there probably will be only a flare or two on the negative, and perhaps a few points of flame where it was brightest when the shutter was tripped.

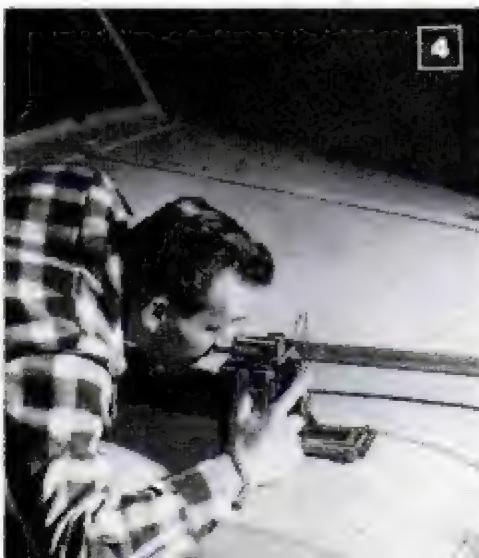
Try this simple test and you will see what happened: Place a lighted candle on a table with a clock or some other small object near by. Focus on the candle flame and set the lens for an average daytime exposure. After shooting the picture, take a second one, using an exposure 1000 times as great. The first shot will show only the flame, nothing more. But the second shot will get the scene in detail. That's the trick in shooting night-fire pictures.

Multiplying the exposure is simple enough with almost any camera. If the

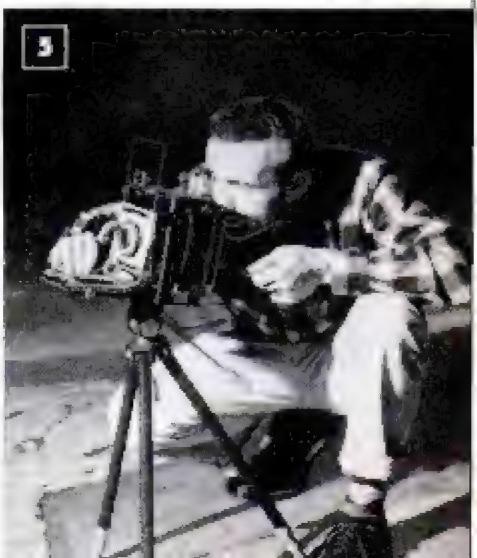
The three photos below, and also Fig. 2 above, show ways of supporting the camera firmly for the long time exposures often required. A heavy-duty tripod is best, but a post, car fender or box will do in a pinch. Holding the camera firmly against a post, or light pole, as in Fig. 3 usually will get the picture



3



4



5



NIGHT-FIRE PICTURES

shutter speed for the average daytime shot works out well at 1/100th second, exposure will be increased 100 times by a one-second exposure. Opening the lens one stop doubles the intake of light. Two stops quadruple the amount of light admitted, giving 400 times the daylight exposure. Using an exposure of 1/100th second at f:16 as a unit, Table I on page 220 shows what happens as shutter speed is slowed and the diaphragm opened. Because shutter speed and diaphragm openings measure light by time and area, they multiply each other. By opening the diaphragm fully and setting the shutter on time exposure, the amount of light admitted to the film is increased enormously. Note, for example, how it adds up in Table II. However, even with greatly increased exposures, foreground objects still will appear on the negative as silhouettes, as shown in Figs. 1, 6, 7 and 9. By simply flashing a single bulb over the foreground you will fill in areas not illuminated by firelight. Good examples of the effectiveness of the bulb in bringing out the picture story are Figs. 8, 11, 12 and 14. However, there are instances where use

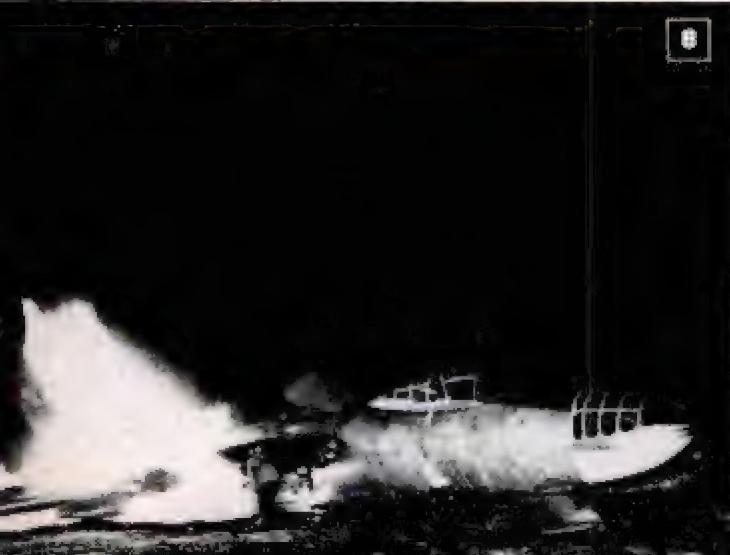
Without foreground lighting this picture would not have told the full story of the stricken plane. Note the detail picked up by flash-lighting the scene

Photos by Richard W. Emery and Charles Tally



Always be alert for opportunities to picture firemen at work. Here the figures are silhouetted against the blaze by a short exposure that stopped action

Here's a shot in which reflected light from the blaze lighted the foreground, making the flash unnecessary. Silhouettes of firemen give feeling of action





10



11



12



13

of the firelight alone heightens the dramatic effect. As an example of this, compare Figs. 14 and 15 and also refer to Figs. 10, 13, 16 and 17. Camera position should also be considered. For example, the big blaze in Fig. 1 was shot with the camera at ground level while that in Fig. 12 was shot from a ladder. The roaring oil-well fire pictured in Fig. 13 lighted up the area for a mile around. Everything appeared as "bright as day." But a daytime exposure got only the flame and a small portion of the wreckage in silhouette. In this case the spectacular flames justified the risk of the short exposure. Shooting upward from a comparatively low level accentuated the height of the flames.

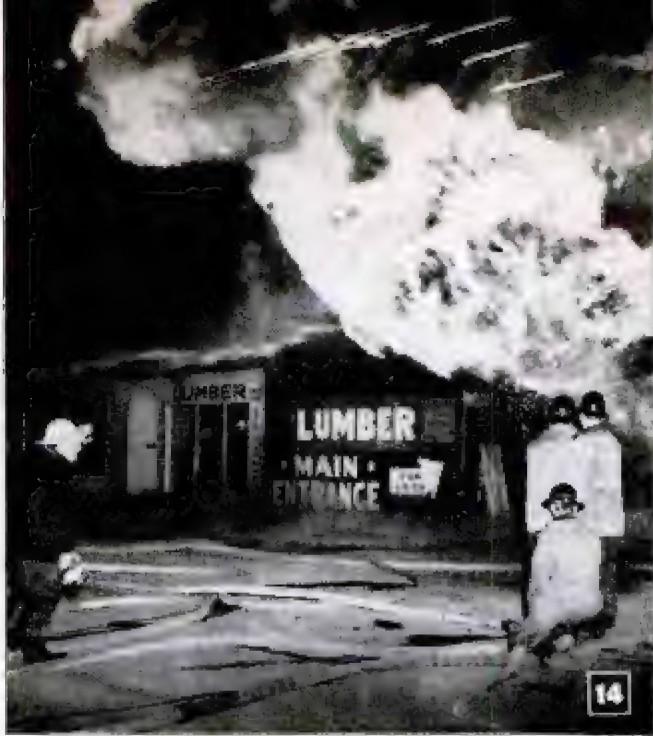
If, in the excitement, you forgot to bring along a heavy-duty tripod like that in Fig. 5, you can quickly improvise on the spot a suitable camera support for a time exposure as in Figs. 2, 3 and 4. Whatever is utilized for this purpose must be rigid. A

Table I

1/100th sec. at f:16—1 unit (daytime exposure)
1 full sec. at f:16—100 units
5 full sec. at f:16—500 units
1/100th sec. at f:16—1 unit
1/100th sec. at f:11—2 units
1/100th sec. at f:8—4 units
1/100th sec. at f:5.6—8 units
1/100th sec. at f:4.5—16 units

Table II

1/100th sec. at f:16—1 unit (daytime exposure)
1 full sec. at f:16—100 units
1 full sec. at f:4.5—1600 units
5 full sec. at f:4.5—8000 units



14



15

rectangular wooden box such as that shown in Fig. 2 is just the thing—if you can find it. The cleats across the ends will support the camera at the proper angle with a minimum of blocking or other adjustment, and you can position the camera at three levels simply by placing the box in different positions. The next best thing is to steady the camera against a post, Fig. 3, or on the front fender of your car as in Fig. 4. Of course, you will remember to stop the engine.

While you are about the business of preparing to take photos, watch for dramatic stopped action. Examples are Figs. 6, 7, 8, 14 and 15. Firemen often group themselves on a hose line and stand braced and motionless for seconds, giving you the opportunity for a sharp silhouette. Keep always in mind that the average exposure time will run from one to five seconds. Watch for the development of pictorial foregrounds and be ready to shoot the picture the instant the composition takes form.

★ ★ ★

In the two photos above, the foreground flash in the one at the left showed the hose lines being laid. As the blaze became larger and more intense the photographer moved his camera farther back and still picked up hose lines and firemen by reflected light with a second shot. Two photos show rapid spread of flames. Note burning insulation on wires

In the left-hand photo, below, the photographer chose a position which would silhouette building, firemen and hose streams against the flames. Both photos emphasize the importance of including sufficient detail in fire shots to tell the story. One glance at the right-hand photo and you know a ship is burning because prow shows amid flames

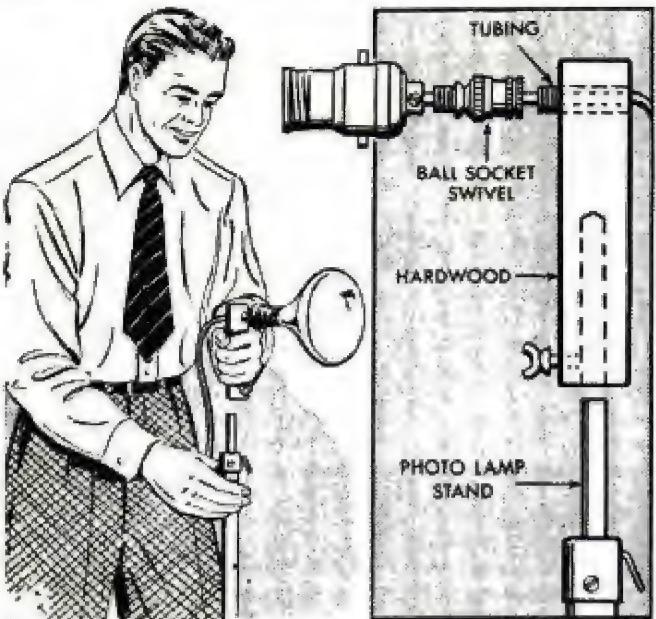


16



17

Lamp Fixture Held in Hand or Mounted on Stand



Attached to this easy-to-make fixture, your reflector-type photoflood or photo spot lamp may be held either in the hand or mounted on a photo lampstand. The fixture is a 1 x 1-in. hardwood block, 5 in. long, having rounded corners to make it easier to grip. A ball-socket swivel is used to make the lamp socket adjustable. The swivel is screwed onto a short length of standard threaded tubing that has been turned into an undersized hole near the upper end of the block. The lower end of the block is drilled 2½ in. deep to slip over the stand. If desired, a locking wing screw may be improvised by soldering half a washer in the slot of a machine screw, which then is threaded into an undersized hole in one side of the block.

Arthur Trauffer, McClelland, Iowa.

Link Adapts Auto-Focus Enlarger to

Use of Longer-Focal Lens

Limited to one specific lens in my auto-focus enlarger, I was never able to use a lens having a longer focal length. To save the cost of a regular extension tube made for this purpose, I adapted the enlarger to take more than one lens by fitting it with an adjustable link, or extension, to hold the lensboard farther out from the column. To do this, I sawed through the metal casting between the lensboard and the enlarger head and drilled and fastened a hardwood link to the two projecting stubs. By using wing nuts, I not only was able to adjust

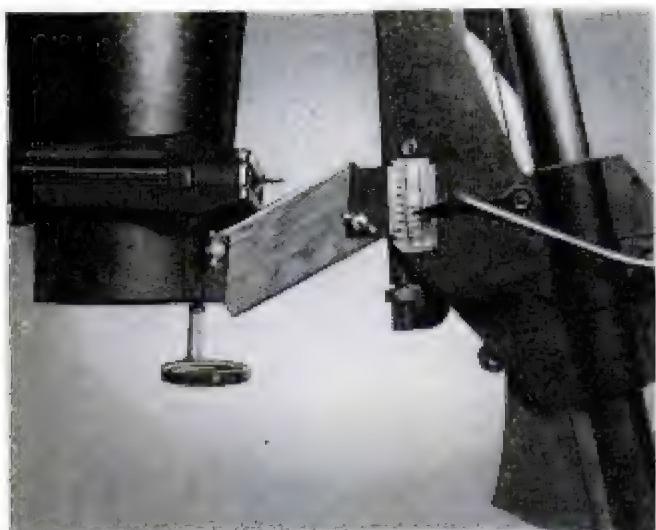
the link easily, but was able to tilt the lens-board when necessary to correct distortion in the print. Note the position of the wing nuts in the link, each being placed in opposite corners. Also, it should be noted that the corners of the link at which the wing nuts are located are rounded. Lock washers under the wing nuts will prevent slippage once the link is set.

Bert Lovett Forse, Washington, D. C.

Rack Aids Photo Blotter Drying

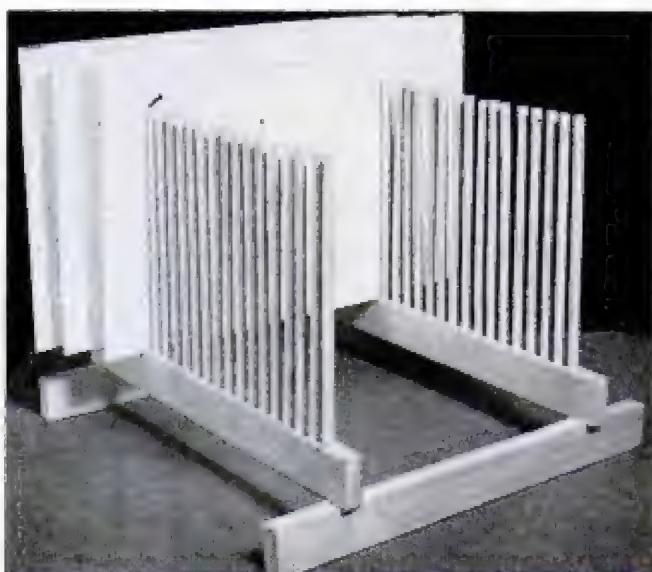
An efficient drying rack for blotters can be made by drilling cross members of a frame assembled from $\frac{3}{4}$ x $1\frac{1}{2}$ -in. stock to take the ends of $\frac{3}{8}$ -in. dowels as shown. The holes are spaced $\frac{3}{4}$ in. apart on centers. In permitting free circulation of air around each blotter, the rack makes quick work of drying large numbers of blotters when the weather is damp.

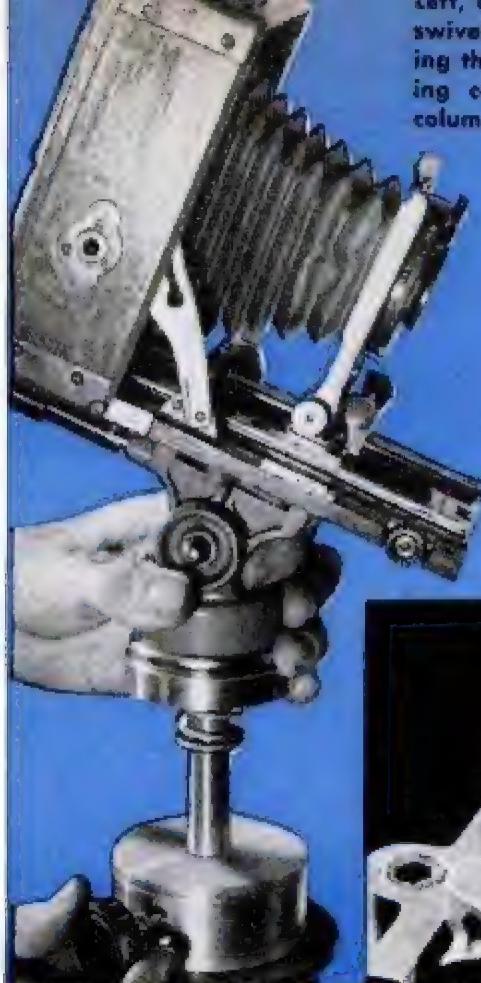
Hartwell J. Kennard, Gonzales, Tex.



A Helping Hand . . .

Santa generally is a pretty busy fellow come December. Right now the poor guy is going full blast trying to meet the 25th deadline. A Christmas toy story in the November issue shows how you can lend a helping hand by starting your workshopping early and save money in the bargain.





Left, camera can be raised, lowered or swiveled to any position without shifting the tripod legs. Right, pad supporting camera is press-fitted to top of column and locked with a setscrew

Below, comming pins which lock column are axially drilled off-center with clearance and tap holes for a locking screw. Concaves filed at ends of pins bind on the column



ADJUSTABLE-COLUMN TRIPOD

DESIGNED FOR CAMERA tripods not having an adjustable column, this fitting provides quick adjustment of camera height without moving or telescoping the tripod legs. As shown in the detail and pictured above, the sliding column, which can be made 12, 18 or 24 in. long, is held at any desired height by an improvised cam lock fitted into a disk which is screwed to the tripod top. The disk and tripod top are center-drilled to take the column in an easy sliding fit. The disk also is drilled transversely off-center, the hole cutting into the center hole about one-third its diameter. The comming pins which slide in this hole are drilled off-center axially, the short pin with a tap hole, the long pin with a clearance hole for an 8-32 screw. The ends of the comming pins are milled or filed to a $\frac{3}{8}$ -in. radius, each concavity clearing the axial hole by about $\frac{1}{2}$ in. When the knob is tightened the concave ends of the pins are drawn tightly against the column, holding it securely in any position. Note that there is a cushion spring placed between the cam lock and pad supporting the camera. The spring is held in place with rubber rings, or washers, and prevents breakage should the cam lock be loosened inadvertently.

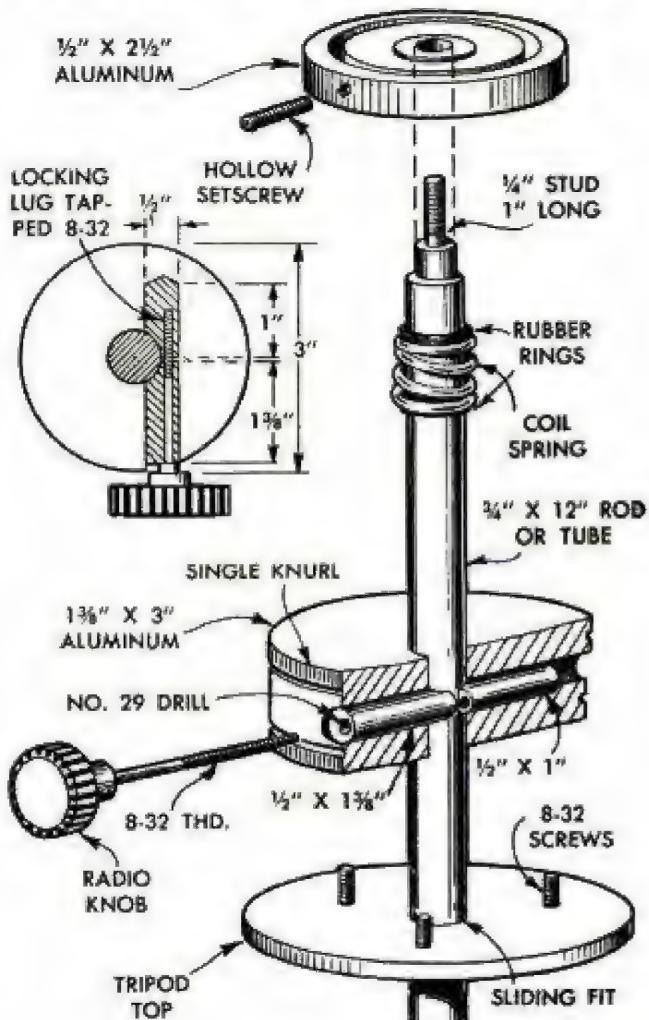




Photo Enlarger Substituted For Contact Printer

If you use a contact printer only infrequently and not often enough to warrant the purchase of one, you can save the cost of one, as well as the price of contact paper, by letting your enlarger take over. All that's needed is a piece of clear plate glass approximately 14 x 16 in. Whether making one or several prints at a time, first place a sheet of enlarging paper on the easel emulsion side up, and then lay the negatives on the paper, emulsion side down. Use the glass to hold the negatives in position and to weight them in contact with the paper, being sure that the glass is clean on both sides. Check before making the actual exposure to see if the enlarger head is high enough to cover the entire area being printed. The exposure is made as you would in making an enlargement. The lens aperture is used to control the amount of light needed for the exposure.

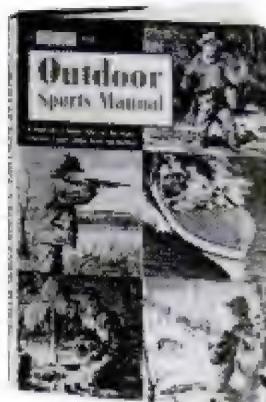
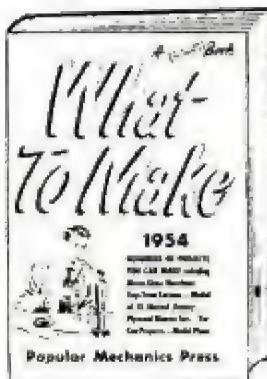
Robert C. Florian, Chicago.

Glycerin Makes Ground-Glass Viewer More Translucent

For close-up pictures, some photographers prefer a fine focus on the ground-glass viewers of their cameras. To get this, a spot of glycerin the size of a half-dollar is placed on the matte side of the glass, which increases the translucence of the glass at that point. Then, to get an even finer focus,

a magnifying glass may be used. To make the viewer permanently translucent, the glass can be worked down by rubbing the matte side with a mixture of oil, 3 parts, and rottenstone, 1 part. The face of a large cork should be used to rub the mixture on the glass.

Popular Mechanics Bookshop



What to Make

The latest edition of an old-time favorite, this book contains 500 projects for the home workshop craftsman. Included are glassware art objects, a baby biplane, occasional furniture and toys from shipping cartons. Here are 240 pages that promise many evenings of fun. \$2.00

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Fall is the outdoorsman's time of year. It's the season for game birds and a last big catch of fish before the winter closes in. Here's a book chock-full of ideas on guns, traps, outboard motors, fishing gear and boats, along with helpful tips on camping and outdoor life. Price, \$2.00

In One Evening

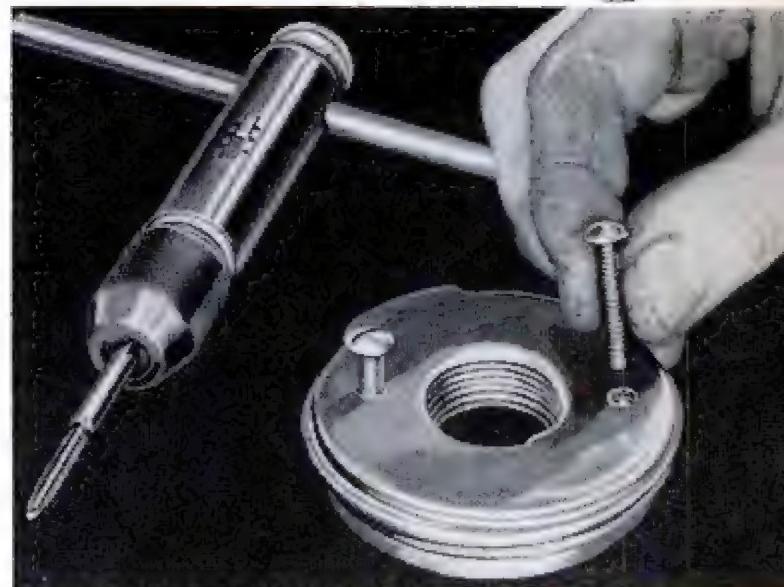
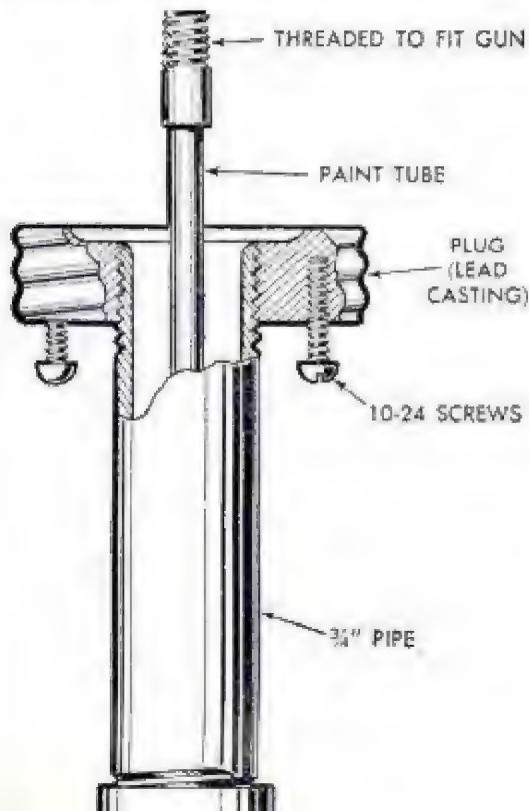
. . . you can finish any of the attractive and useful projects in this book. Here are plans, diagrams, photos and instructions for making modern tables, footstools, magazine racks, picnic iceboxes and a good many other exciting but quick-to-complete projects. Price, \$2.00

All books available from Popular Mechanics Book Department, 208 E. Ontario St., Chicago 11

TOUGH-UP CONTAINER *for Spray Guns*

By Walter E. Burton

THIS ATTACHMENT is so easily made that it can be duplicated to provide separate containers for each touch-up color likely to be used. The detail below and the photos at the right show clearly the construction procedure. First, a lead or die-metal plug is cast, using a fruit-jar lid as a mold. This forms threads on the plug that fit the spray-gun cap. Before pouring the metal, place a hardwood dowel in the center of the mold, the diameter of the dowel being slightly less than the outside diameter of the 6-in. pipe nipple. The latter cuts its own threads when turned into the casting. Drill and tap two holes in the casting for 10-24 screws which serve as handles for removing the container from the spray-gun cap. Then make a paint tube, or suction tube, and thread to fit the gun.



Above, threads formed on edge of soft-metal plug fit those in spray-gun cap. Pipe container cuts its own threads when turned into plug casting. Below, duplicate containers fitted with pipe cap at each end provide a quick change from one color to another

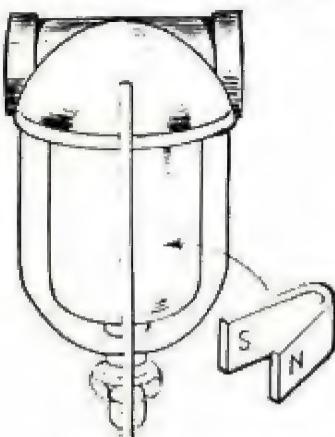


Sturdy Rack Holds Long Pipe For Safe Hauling



Rather than risk damaging long sections of pipe by dragging them on the ground, one farmer erected a wooden rack on his pickup truck for hauling the pipe as shown. Consisting of X-shaped end sections of 2 x 4s and cross bracing cut from lighter stock, the rack holds the pipe high enough to clear the top of the truck cab, permitting the pipe to overhang several feet at each end of the rack.

Tiny Iron Particles in Auto Fuel Removed With Small Magnet



the magnet will prevent these particles from gathering on the needle valve, causing the carburetor to flood.

Ed Packer, Chicago.

Improvised Carbon Contact Stops Intermittent Firing

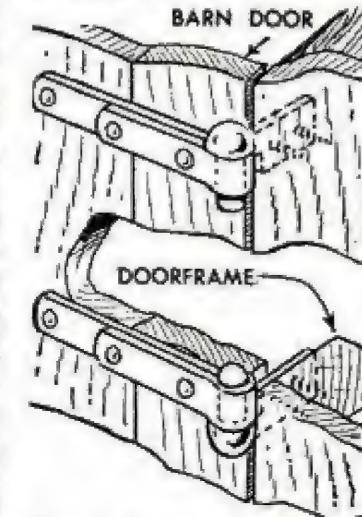
An automobile engine frequently will miss due to poor contact between the carbon and spring contacts on the distributor rotor arm. If the brush is worn flush with the metal band that holds it in place, the result will be poor contact that causes the

engine to fire intermittently at normal speeds. When a new distributor cap cannot be provided immediately, remove the carbon contact and replace it with one made from an old motor or generator brush, and install it so that it projects about $\frac{1}{8}$ in. beyond the metal. Then scrape off any corrosion on the points with a sharp knife. Before installing the improvised carbon, examine the spring contact to make sure that it has not been damaged by arcing.

Cattle Cannot Remove Barn Door If Top Hinge Is Inverted

When hinges of the type shown are used on barn doors, invert the top hinge so the pin points downward. This arrangement will prevent livestock from nosing the door off the hinges. Also, it will prevent unauthorized persons from entering a building by lifting off a door on which hinges of this type are used. It is best to bolt the hinges in position, securing them with nuts inside the building so they cannot be tampered with from the outside.

G. E. McVickar, Bethesda, Md.

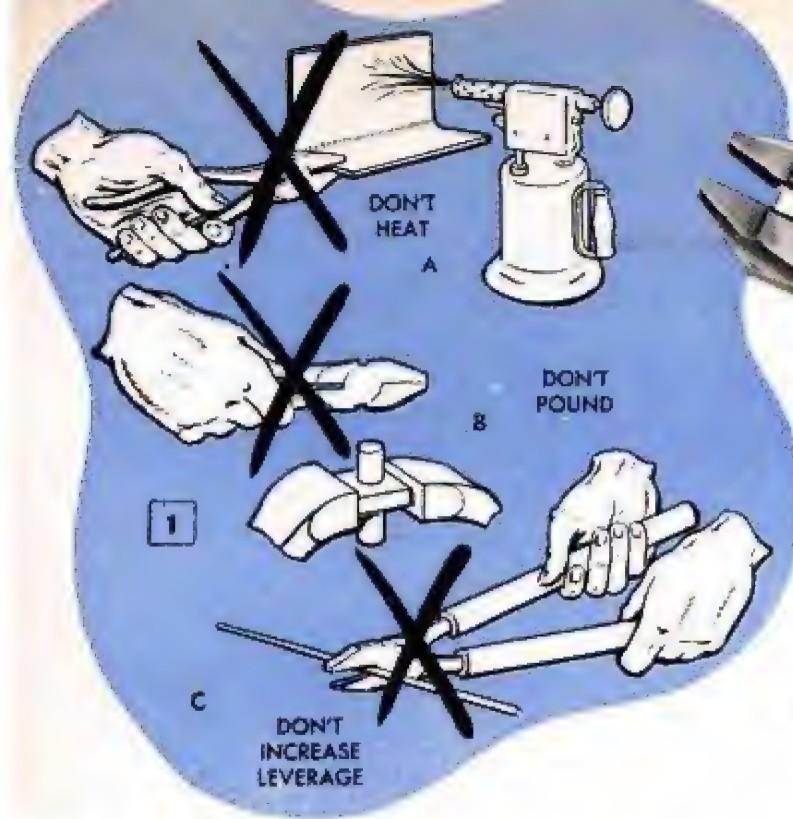


Portable Brush Burner

Easily towed by a truck or tractor, this all-metal trailer furnishes one orchardist with a safe, convenient means for collecting and burning brush and tree trimmings. The bed, which is taken from a pickup truck, is mounted on a chassis assembled from steel channel and steel wagon wheels. The front axle pivots on a fifth wheel welded to a U-shaped bolster that supports the forward end of the trailer bed. Ashes are emptied by dropping the tail gate and sweeping them out.

Charles L. Stratton, Hollis, N. H.





Courtesy of Matthes Klein & Sons

KNOW-HOW with PLIERS

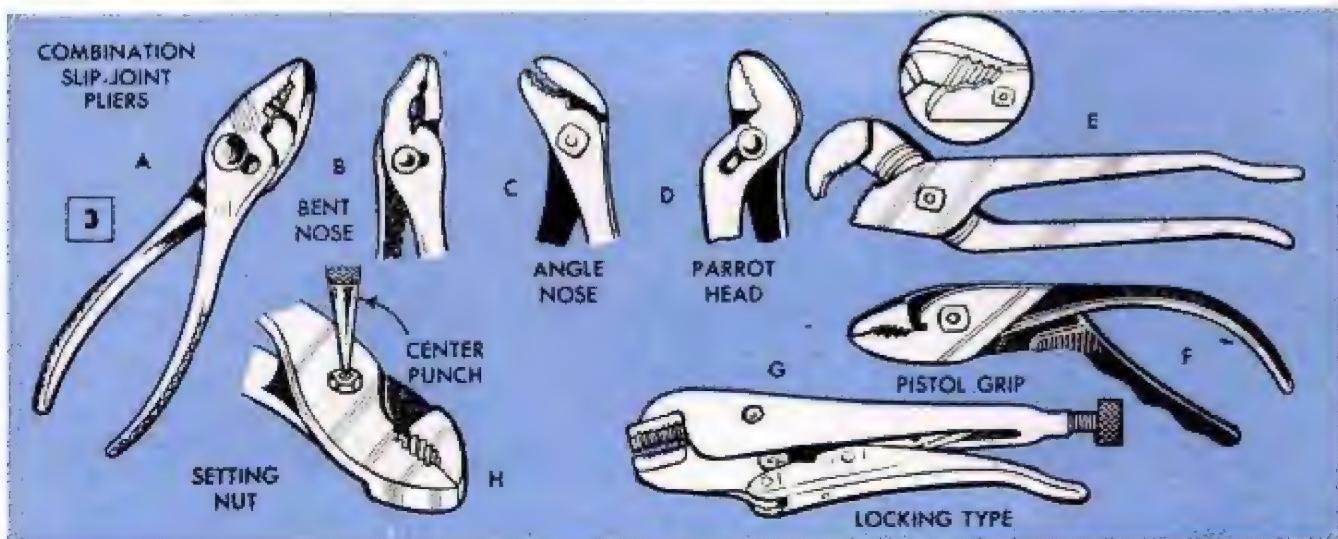
By E. R. Haan

ORDINARY PLIERS perform several hand-tool operations, holding, twisting, turning and cutting being the most common. Other types have both handles and jaws of a design adapted to the special requirements of the job. Most pliers have jaws which are especially heat-treated to withstand any normal pressure that can be exerted on the handles by one hand, and the jaw faces are either single checked or cross-checked (knurled) to afford a secure grip on work of almost any shape.

General usage and care: Good pliers can be irreparably damaged by exposing them to extremes of heat, detail A, Fig. 1, or by using the flat side of the jaws as a hammer, detail B, or by increasing the leverage as

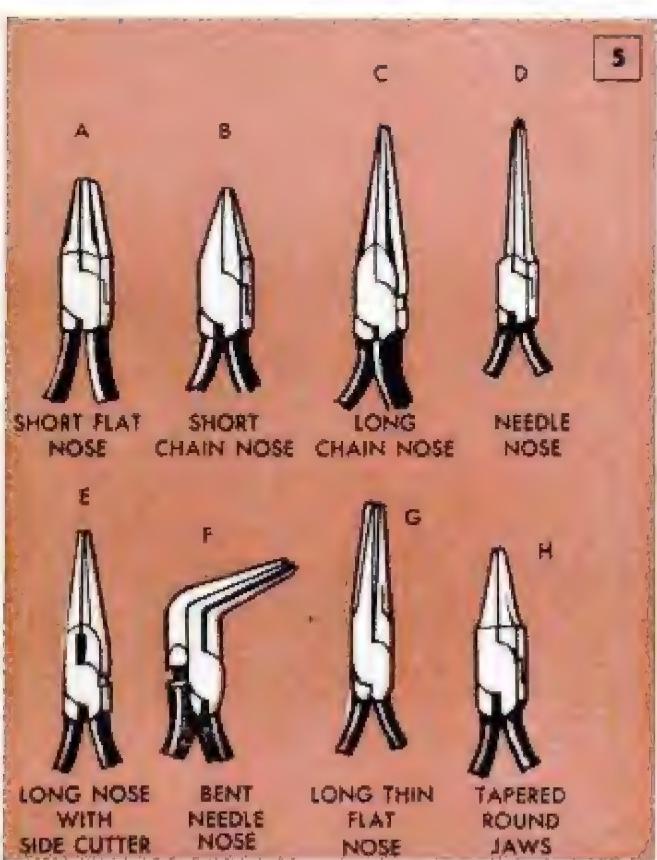
in detail C. To prevent rust on pliers not in daily use, wipe them with an oily rag. Clean the inner surfaces of the jaws with a wire brush or a file card, and coat with oil. A good rust preventive for cutting pliers is to dip them in thinned transparent lacquer. When the coating starts to wear off remove with lacquer thinner and recoat.

To assure easy operation and to prolong the life of pliers, apply a drop or two of light machine oil to the joint occasionally, letting it run in at the base of the jaws. To remove dirt and congealed oil, immerse pliers overnight in benzine or carbon tetrachloride (in a closed container), then coat with oil to prevent rust. Avoid dropping pliers on concrete floors, which may crack

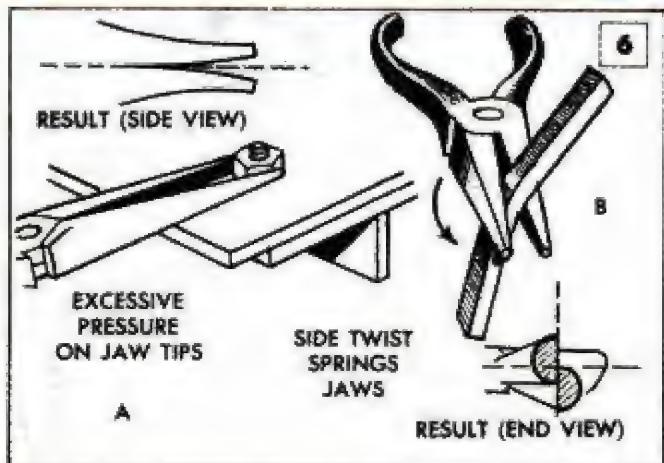




4



5



6

hardened parts. An invisible crack may develop into a break under strain. When gripping hardened steel, protect the jaws from dulling and losing their grip by using cardboard, canvas or fiber pads. Pins and rods that must be held firmly for turning or pulling, can be wrapped with fine emery cloth to obtain a secure grip. Dulled checking or knurling on the jaws often can be restored by using a fine triangular file. Don't use pliers to turn nuts except in an emergency.

Combination pliers: Slip-joint combination pliers, detail A, Fig. 3, are general-purpose tools. They can be adjusted to two or more size ranges by means of a sliding pivot. The jaws have sharp, hardened cross teeth similar to those on the jaws of a pipe wrench. Often there is a short shearing edge next to the head, or in the head itself, for wire cutting. Besides the straight-nose type, bent-nose, angle-nose and parrot-head variations are available, details B, C and D. Similar pliers are used on water-pump and conduit locknuts, and also for ignition work. Note how the jaws of different types are notched (burner cut) or are straight to hold round or flat work. The slip-joint pliers shown in detail E have an extremely powerful gripping action. A series of closely spaced, self-cleaning milled joints take the strain and eliminate wear on the pivot bolt. Slip-joint pliers having pistol-grip handles, detail F, Fig. 3, are designed for greater holding power and easier handling. Locking pliers, detail G, have a built-in, compound leverage to exert great pressure. When the handles are locked in position, the tool serves as a small pipe wrench or vise. When the nut on the pivot bolt of the pliers loosens, it should be tightened to eliminate excess play. File the end of the bolt flush with the surface of the nut; then prick-punch as in detail H, Fig. 3, to lock the nut on the end of the bolt.

Other holding and bending pliers: On most pliers used for small work as in Figs. 4 and 5, the jaws are flat inside and finely cross-checked. The heavier ones are used for bending light wire and sheet metal, while the lighter ones are designed for picking up and holding small parts, as in assembly work. For ease in opening and closing pliers constantly, hold them as in Fig. 2, with the small finger on the inside of the handle. On repetitive work, pliers having spring-opened handles are faster and less tiring on the fingers. Long-nose pliers are handy to get into narrow, restricted places, Fig. 5, A to H inclusive. Some of these are equipped with side cutters. Too much pressure on the tips of long-nose pliers may bend or break them, detail A, Fig. 6. Usually you can restore tips that are bent open by inserting a $\frac{1}{16}$ -

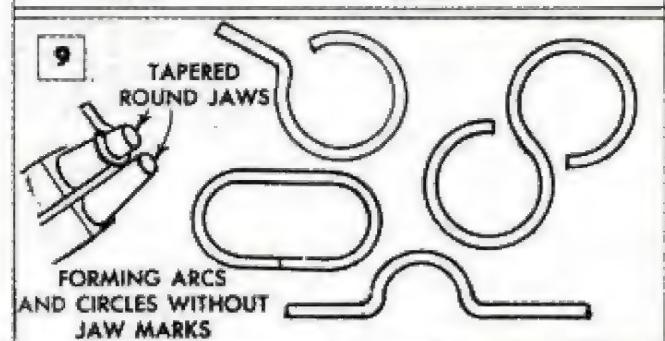
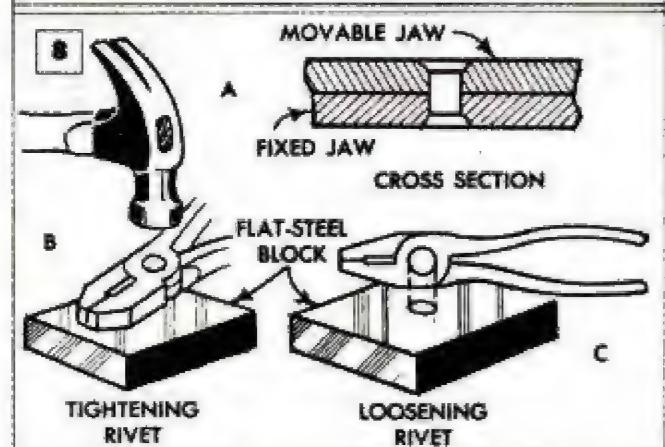
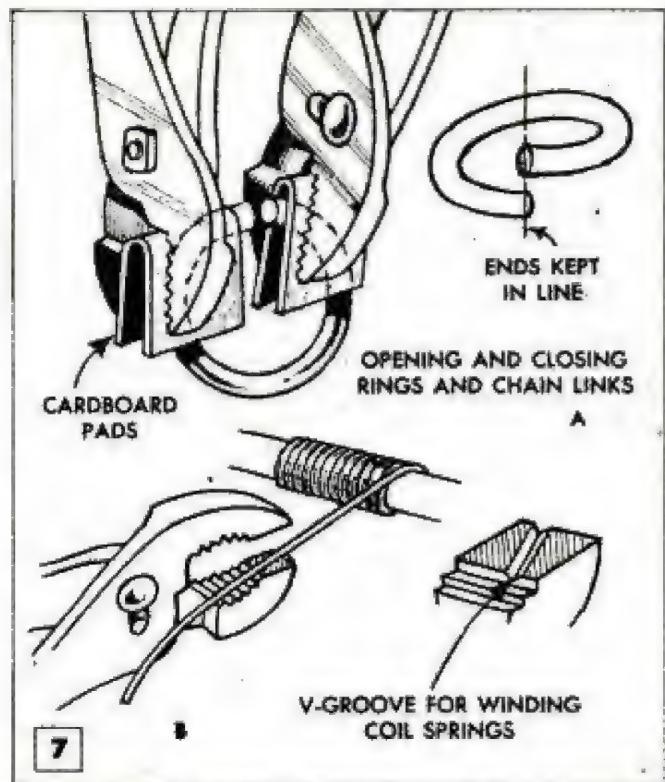
in. metal strip between the jaws and striking them carefully with a hammer about $\frac{1}{2}$ in. from the tip. Frequently long-nose pliers are bent or broken by excessive side twist, detail B, especially those having side cutters.

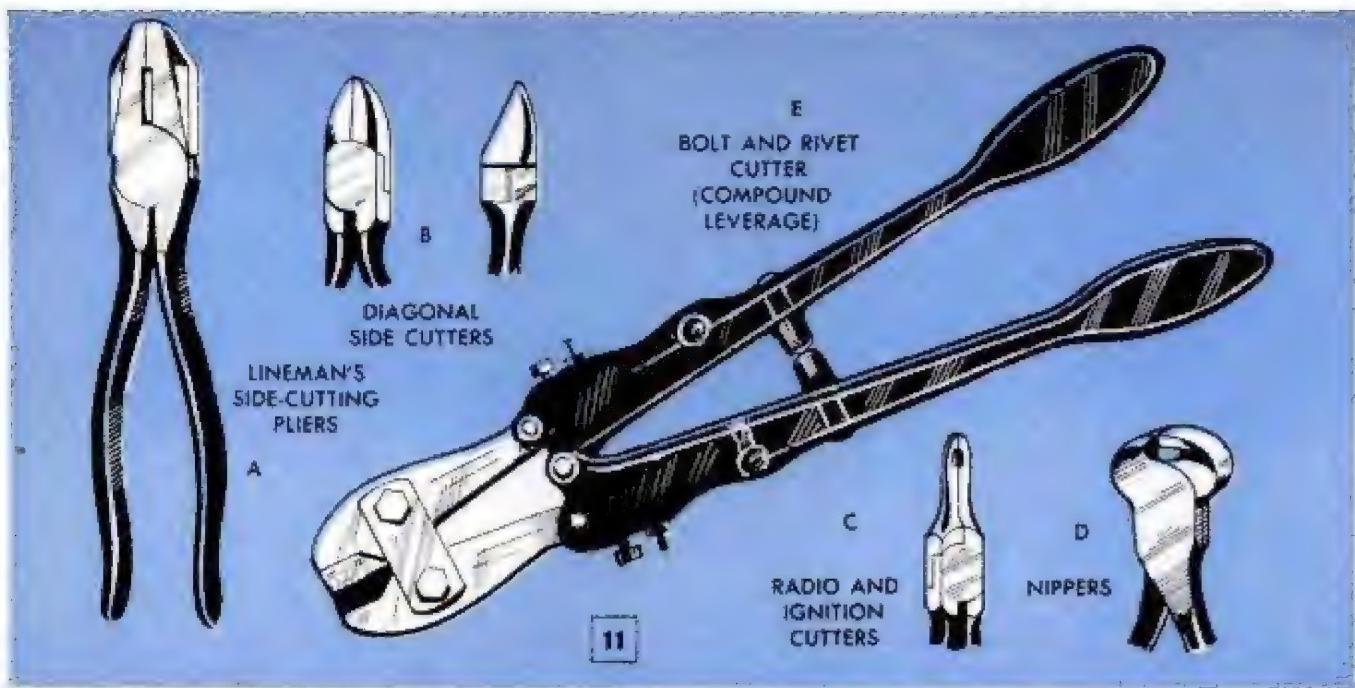
To avoid marring nickel and chromium-plated parts that must be gripped with pliers, use protecting pads. Or, you can stick a piece of adhesive tape over each jaw if it is flat and finely knurled. Clean the jaws later with a solvent. To open rings and chain links, spread them sideways, using two pliers as in detail A, Fig. 7. If the ends of the link are welded together, grip them in a vise and with a hacksaw first. Protect the finish with pads. When winding coil springs hold the wire with an old pair of pliers having a diagonal V-groove ground in one jaw, detail B. The depth of the groove should be such that the wire is gripped by the other jaw.

Adjusting "box"-joint pliers: Nearly all pliers except the combination type have a "box" (half-lap) joint, detail A, Fig. 8. When there's excessive side play due to a loose rivet, tightness can be restored as in detail B. The jaw that does not rotate but is fixed to the rivet is laid on a steel block or anvil. Then the exposed end of the rivet is struck with the flat face of a hammer to spread the metal. Don't use the peening end of a machinist's hammer or a punch for this. Check for tightness after each blow. To loosen a tight rivet hold the pliers in the same way over a hole in the block, detail C, so that the rivet is not supported.

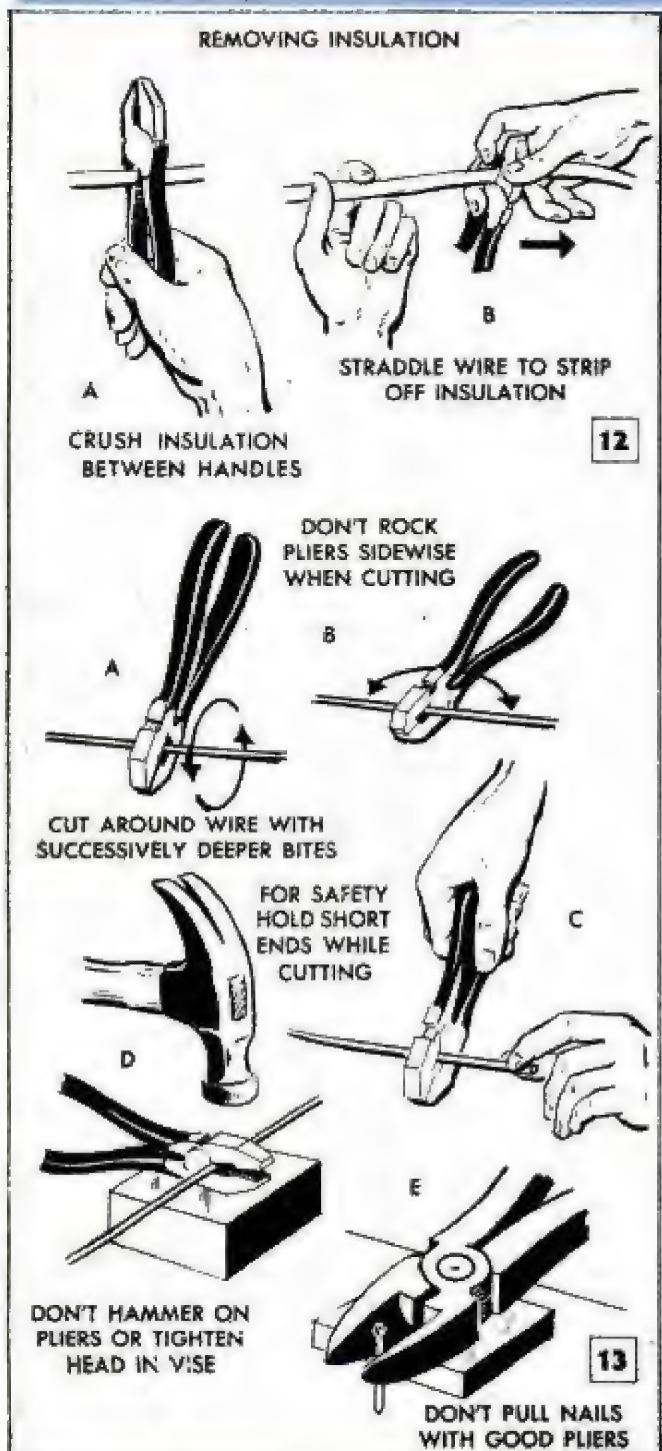
Bending arcs and circles: Chain-nose pliers shown in details, B and C, in Fig. 5, are handy for bending angles, arcs and circles in light wire and metal, Fig. 10, where a straight portion of the work can be held between flat jaws. For bending eyes in wire without getting jaw marks on the work, use pliers having round jaws, or pliers having one round and one flat jaw for greater gripping power. The flat jaw contacts the outside of the curve. Round jaws may be of one diameter, stepped diameters, or they may be tapered. Diameters larger than those of the jaws are formed by a series of small bends spaced equidistantly, Fig. 9, or by wrapping the material around a rod or cylinder.

Types of cutting pliers: Lineman's and electrician's straight side cutters, detail A, Fig. 11, are designed primarily for cutting electric wire. Some have insulated handles, but plastic grips that slip over plier handles also are available. On diagonal side cutters, detail B, the cutting edges are at an angle, which makes the pliers easier to handle when nipping off projecting ends of wire, nails and pins close to the surface of the work. These pliers are available in





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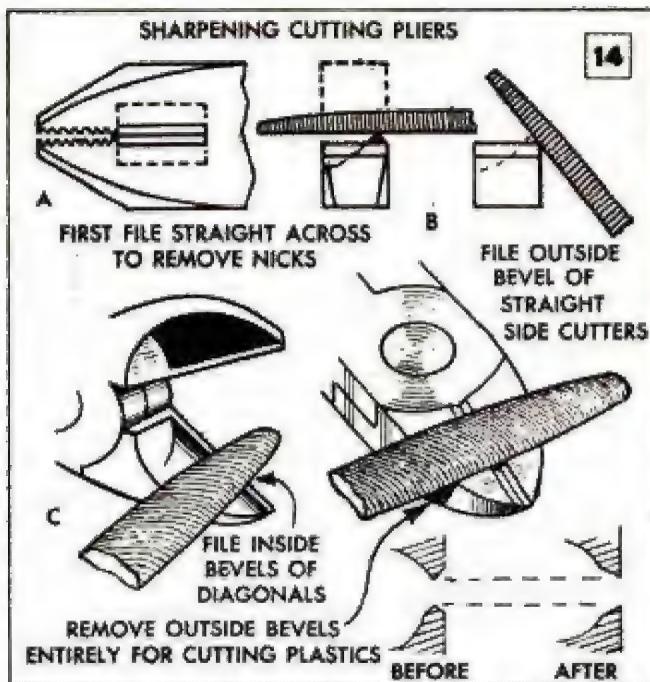


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standard or high-leverage types—the latter having the pivot closer to the ends of the jaws. Side cutters are provided at the ends of pliers used for radio and ignition work, detail C. Nippers, detail D, cut at their ends, come in both standard and high-leverage types. They are used to cut off projecting wire, nails and pins close to the surface of the work. Bolt and rivet cutters, detail E, have powerful leverage and cut at the side, end or both.

How to use cutting pliers: To remove insulation from wire, first crush in the insulation between the handles of lineman's pliers as in detail A, Fig. 12. Then strip it off, holding the pliers as in detail B, so the cutters straddle the wire but do not cut it. Some side cutters have notches to slip over the wire for stripping. Be careful not to cut "live" wires. Besides the danger of shock, the arc caused by short-circuiting a double conductor that carries current may ruin the cutting edges.

Ordinary cutting pliers are intended for use on small wire and rods of soft metal such as brass, copper, aluminum and mild steel. Don't use them for cutting hardened pins and piano wire. To cut harder metals, use specially hardened cutting pliers such as are used by makers of coil springs. Cut large-diameter wire all around with a gradually increased bite, detail A, Fig. 13. Or, cut the wire part way, then grip it with the flat part of the jaws and bend it back and forth until it breaks. This procedure is of value also where sharp, exposed ends of wire can cause injury. Don't subject the cutters to side strain, detail B, which is likely to damage the edges. For safety to yourself and others near by, hold the ends of wire, nails or pins as in detail C, while cutting them. If you can't hold the wire, cup your hand over the head of the pliers



or turn them so that the piece will be stopped by the bench top or floor. Don't force the cutters through thick material by hammering on the head of the pliers, detail D, or applying pressure in a vise. As side pressure ruins cutting edges, don't use new diagonal pliers for pulling brads and finishing nails, detail E, or cotter pins from castle nuts. For these purposes use an old pair of pliers no longer serviceable for cutting. When pulling brads use a protective pad as a fulcrum to prevent marring the adjoining surface of the work.

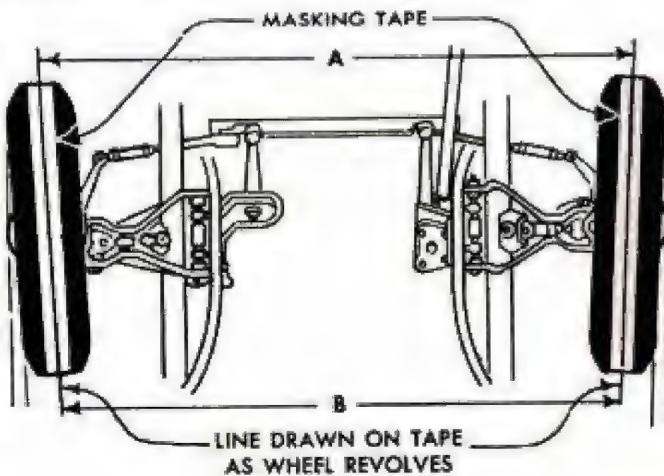
Sharpening cutters: Most side cutters and nippers can be resharpened when nicked or dulled. On side cutters the cutting edges to be resharpened must project above the level of the jaw faces. If ground below this level the cutting edges will not come together. Use a very fine file such as a No. 2 half-round diemakers file, or a thin, fine-grit abrasive stone, holding the pliers between pads in a vise. The degree of hardness of cutting pliers is slightly less than that of files. First dress down the

edge to remove nicks, detail A, Fig. 14, also Fig. 15. On side cutters, you file the outside bevel, detail B, but on diagonals you file the inside bevel, detail C. Just touch-up the opposite side to produce a slightly rounded edge that still feels sharp to the touch. This is more resistant to nicking. Retain the original angles when filing. Also check constantly by closing the jaws and holding toward light. When the edges are restored they should close light-tight along the entire length.

To alter diagonals and nippers for cutting plastics, grind or file the head down as in detail C, Fig. 14, to remove the small outside bevels of the cutters. When grinding hold the edge to the wheel with very little pressure. Dip frequently in water to avoid drawing the temper. For cutting plastics a sharp edge is better than a rounded one, as the latter does not make a clean cut but tears the stock due to wedging action. Pliers having side cutters ground for plastics are no longer suitable for cutting metal. ★★★

Center Lines on Front Tires Aid Measuring Wheel Toe-In

To measure the toe-in of car front wheels accurately, one shop man first applies strips of masking tape over the treads as nearly centered as possible. Then a soft pencil, held against a steady rest, is used to scribe a true line around the circumference of each tire. Following this, distance A at the back edges of the tires, is measured approximately 8 in. from the floor, after which distance B is measured in the same manner. The difference between the measurements, when B is shorter than A, indicates the amount of toe-in the wheels have. As a rule, $\frac{1}{8}$ -in. toe-in is right for most cars, but the original specifications should be checked.



Ear Corn in Overhead Bin Fed Directly Into Grinder



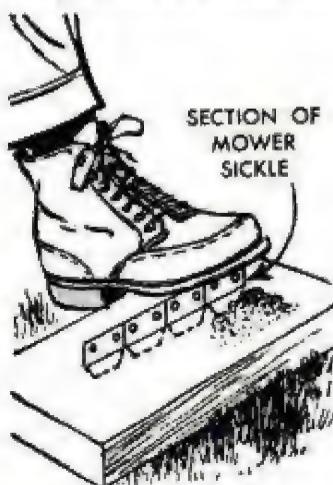
To save extra handling when grinding ear corn, one farmer locates his feed grinder directly under the chute of a hopper-type bin in his granary. The flow of corn is controlled by a sliding shutoff in the bottom of the chute.

George Laycock, Batavia, Ohio.

Micrometer Carrying Case From Revolver Holster

To protect his micrometer from possible damage when stored in a tool kit or work-bench drawer, one machinist uses an inexpensive flap-type revolver holster to provide a case for the instrument. The only alteration made was to sew the bottom closed to keep out dirt, trash, metal shavings, etc. Another advantage in favor of the holster-type case is that it can be worn on the user's trouser belt.

Improvised Shoe Scraper

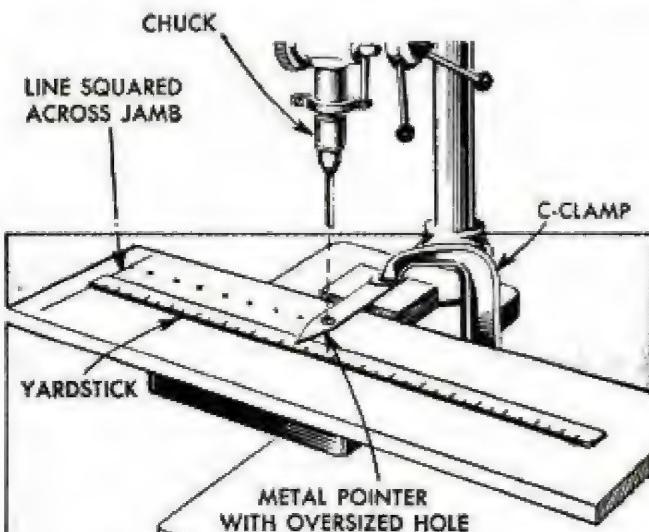


Needing foot scrapers at the dairy barn, milk house and also at the back door of the farm home, one farmer improvised them by cutting 12-in. lengths from an old mower sickle and simply driving each one into a length of 2 x 6-in. stock. The points of the sickle sec-

tions are readily driven into the wood and due to the triangular shape of each section they hold securely. The scrapers can be anchored at the edge of a path with stakes made from $\frac{1}{2}$ -in. rods. The square corners of the knife bars clean shoe soles effectively.

Improvised "Jig" for Drill Press Aids Drilling Cabinet Endpieces

Equally spaced holes for shelf-support brackets can be drilled quickly and accurately in the endpieces of a cabinet or bookcase by improvising a "jig" from a yardstick and metal pointer for use on a drill press. First, square a line across one end of an endpiece where the first two holes are to be drilled, and then place a yardstick on the work so the numerically low end is even with the line. Center the graduated edge of the yardstick lengthwise on the

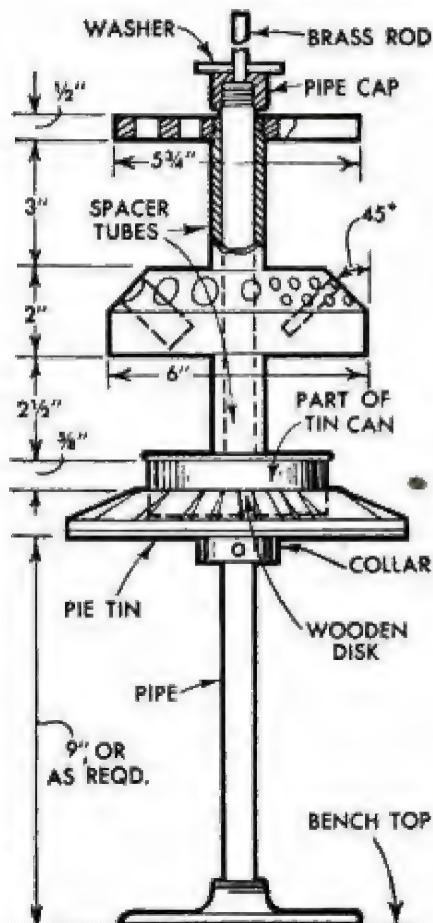


work and thumbtack in place. Following this, cut a pointer from sheet metal which is clamped together with a wooden raising block to the drill-press table. The pointer is cut and drilled so that, when clamped in place, the point is even with the graduated edge of the yardstick and an oversized hole in the pointer arm is aligned directly beneath the drill bit. The wooden block not only is used to elevate the pointer slightly above the surface of the work, but also serves as a guide for the work. Adjustment of the block will determine the distance the row of holes will be drilled from the edge of the work. In use, the work is moved over the drill-press table until the pointer registers on a predetermined measurement on the yardstick, at which point the drill bit is lowered through the hole in the pointer for drilling. In drilling the second row of holes, the work is reversed.

George B. Moses, Unionville, Conn.

To prevent car doors from freezing, rub a little glycerin on the weather stripping.

"Lazy Susan" Rack for Metal-Lathe Accessories



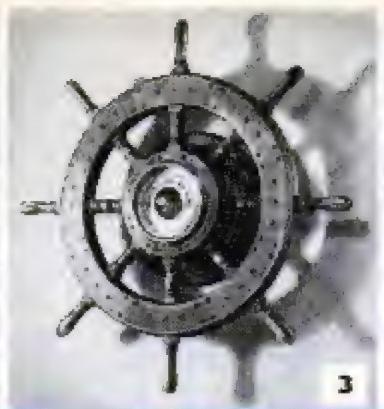
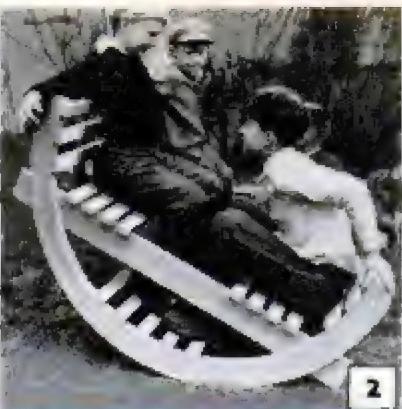
CONSISTING OF A TRAY and two disk holders that rotate on a pipe standard, this handy rack mounted on the end of a lathe bench brings all lathe accessories within easy reach. The standard is threaded at both ends, the lower end being turned into a pipe flange screwed to the bench top. The tray and holders are positioned on the standard by metal spacers and supported by a shaft collar located beneath the tray as shown in the detail. Designed for holding cutting bits, the tray is made from an 8-in. piepan inverted and nailed to a wooden-disk stiffener. A strip of thin sheet metal, or metal from tin cans, is soldered around the rim of the pan, and partitions of the same metal are soldered to the sloping surface to form small compartments as illustrated above in the photo at the lower right. A ring cut from a can is then soldered to the top of the tray to provide a receptacle for miscellaneous accessories. The stiffener disk is drilled in the center to fit against a shallow shoulder cut or filed on a short piece of the same tubing from which the spacers are made. This piece which projects below the stiffener and rotates on the collar in the manner of a hub or bearing, is reamed, as are the spacers, to slip over the $\frac{3}{8}$ -in. standard, and rotate with a minimum of play. The center holder, which is made by gluing two wooden disks together, is mounted in a lathe for bevel-turning one

edge 45 deg. and, if desired, cutting the center of the top surface to form a concavity for holding small parts. Next, the beveled surface is drilled and reamed, as in the photo at the upper left, to provide holes of various sizes in which center drills, chuck keys, twist-drill bits, etc., can be stored. The holder then is drilled in the center to fit against a shoulder cut or filed on the upper end of one of the spacer tubes. The top holder was made from $\frac{1}{2}$ -in. plastic cut in the shape of a disk and drilled, as shown in the photo at the lower left, to hold an assortment of lathe collets. Drilling should be done slowly to avoid fracturing the plastic. As in previous steps, the center of the disk is drilled to fit against a shoulder on the other spacer. The threaded upper end of the standard is fitted with a pipe cap that has been drilled and tapped to receive the threaded end of a brass rod. With a washer slipped over the rod to serve as a stop, this makes a handy place for storing a collet adapter.

Walter E. Burton, Akron, Ohio.

Can Holds Tape on Toolbox

To store a roll of friction tape so it always will be handy, one electrical worker keeps it in a shoe-polish can nailed to the end of his toolbox. The press-fit cover is easily removed or replaced as necessary.



HOW TO SAW SEGMENTS

By Sam Brown



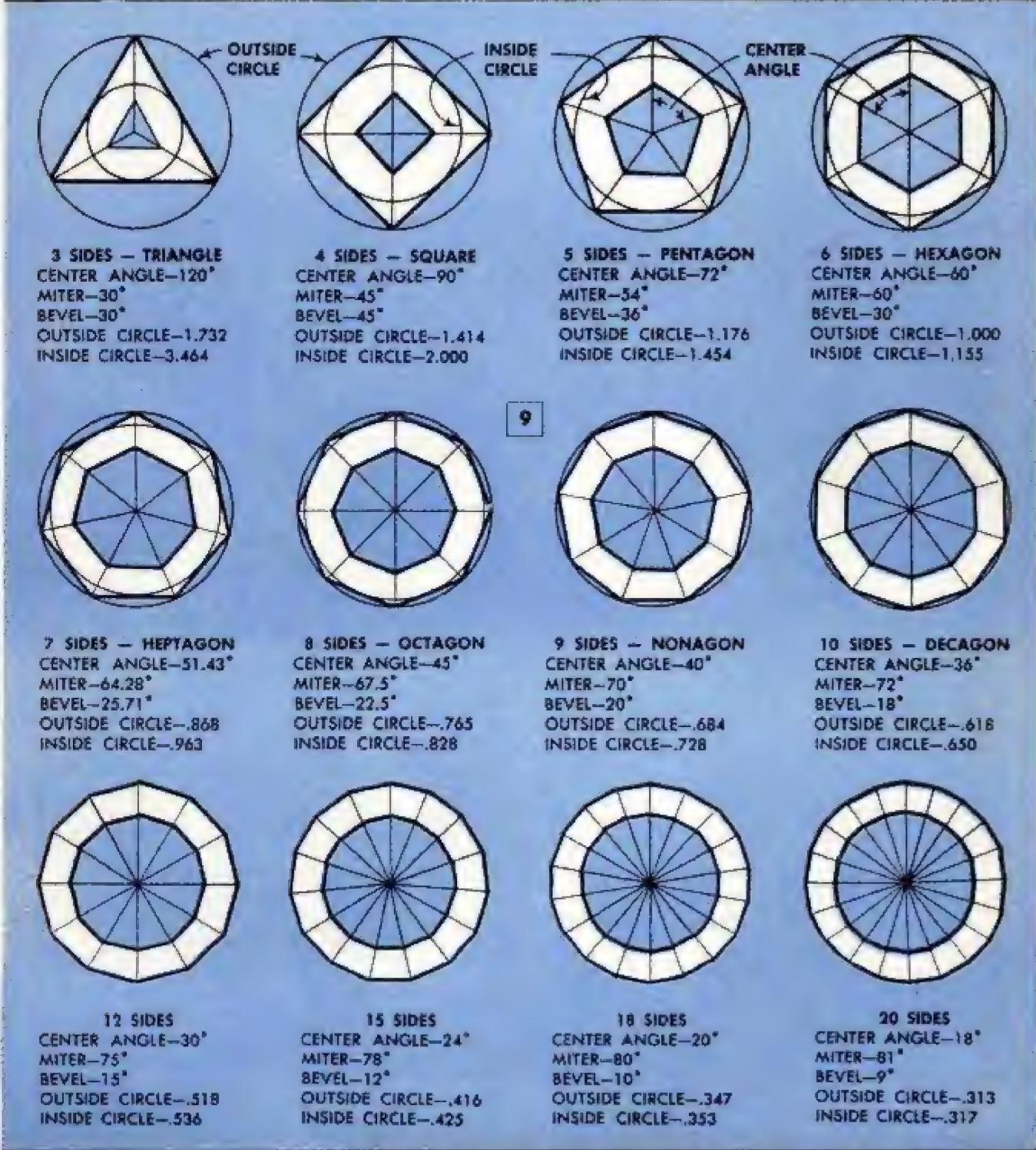
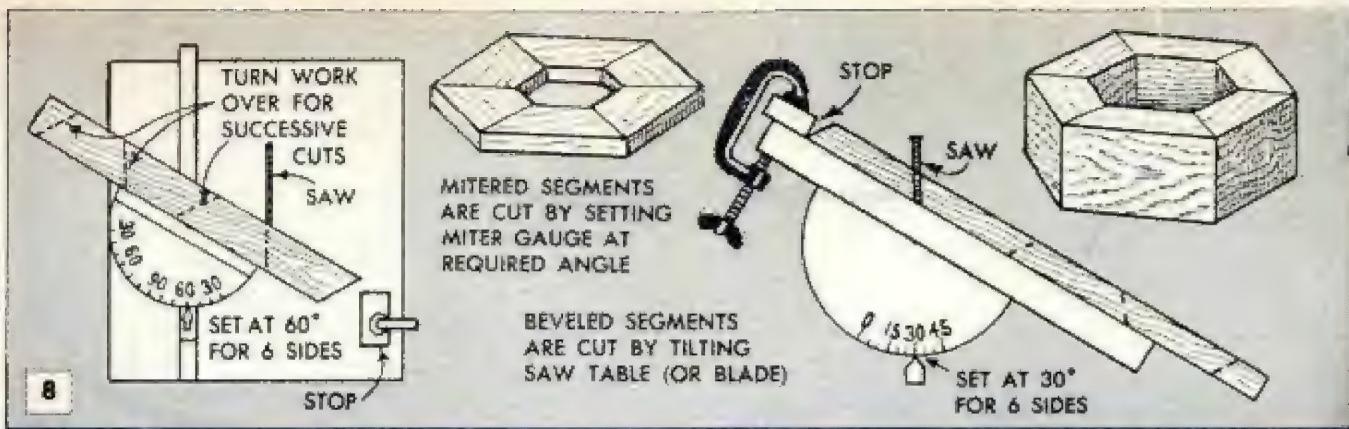
Above, setup for cutting curved segments in two thicknesses of stock. Be sure bandsaw blade is sharp and properly set. Below, an example of the polygonal form is six-sided table built with straight segments



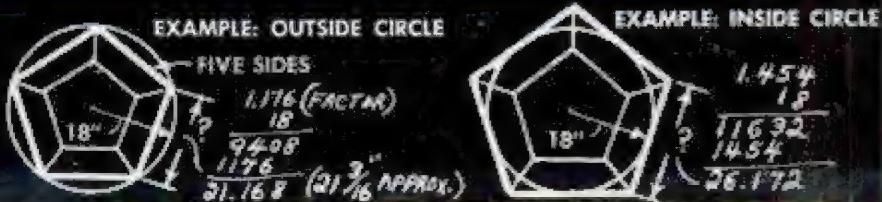
WHENEVER A RING of wood is required for any purpose, either in the circular or polygonal form, you generally can effect a marked saving in stock and achieve far greater structural strength by using segmental construction. The assembly can take a number of forms, typical applications being pictured in Figs. 1 to 4 inclusive, also Fig. 6. The circular, semicircular and polygonal forms find the most common use. Ordinary work of this type is first built up in the basic polygonal form, but only in certain types of construction is this the completed form. Usually circular cuts are necessary to bring the work to the desired size and shape.

Polygons: These are easy to cut to any size required with a circular saw or a miter box. Fig. 9 details 12 regular polygonal forms having 3 to 20 sides. The 4, 6, 8 and 12-sided figures are the ones most commonly used. The data included in Fig. 9 gives the center angle which is necessary when making a drawing of the figure. The miter and bevel settings are given for each figure, and also the multiplying factor to determine the side length of the figure. Fig. 8 shows how the work is done on the circular saw, the workpiece being turned over for the alternate miter cuts as indicated by the dotted lines. This effects a material





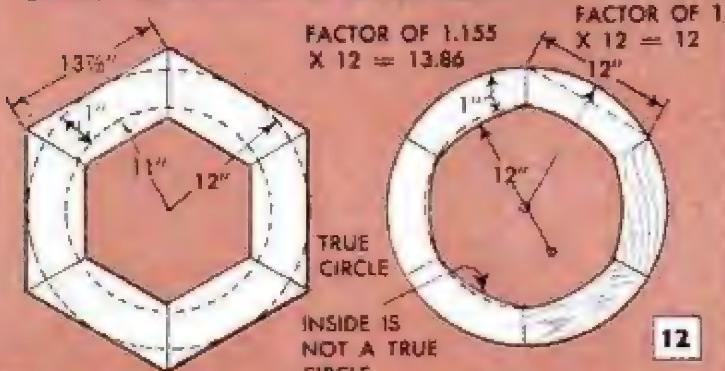
SIDE LENGTH OF FIGURE
IS FOUND BY MULTIPLYING
INNER OR OUTER-CIRCLE
FACTOR BY THE RADIUS
(SEE EXAMPLE AT RIGHT)





10

SAWING TO SHAPE AFTER ASSEMBLY IS ONE METHOD OF MAKING A SEGMENT RING. THIS METHOD AND TWO OTHERS ARE SHOWN IN THE DETAILS BELOW



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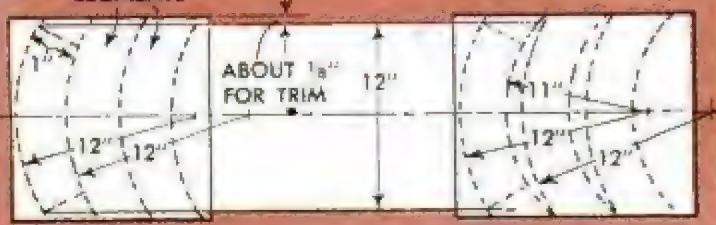
TRUE CIRCLE
INSIDE AND
OUTSIDE

PRECUT TO
TWO RADII

13

ALL EXAMPLES 6-SIDED FIGURE TO
FINISH 24" DIA. (ALLOW FOR TRIMMING IF REQUIRED)

SEGMENTS



saving in stock, as a number of pieces can be cut from one board without undue waste. The angle setting of the saw actually is the same for either miter or bevel, but the readings differ because the miter gauge ordinarily reads 90 deg. for a square cut, while the tilt scale reads zero when the blade is perpendicular with the table. Thus for direct settings, the miter angle is the complement of the tilt angle and the multiplying factor is the length of the side of the figure per inch of radius. The factor to use, inside or outside, depends on whether the figure being worked up is based on an inside or outside circle.

The straight-sided figure: This basic form is complete in itself for a job such as the tree table in Fig. 6. Here no secondary circular cuts are necessary to complete the parts ready for use. When making the tree-table top, the inside course of segments is used as a basis for determining the size of those succeeding, Fig. 7. Probably a more common form of the straight-sided figure, Fig. 11, is an assembly from which a circular ring can be cut on a bandsaw as in Fig. 10. Although the method is simple to do, even where several thicknesses must be stacked and glued, considerable stock is wasted. In some cases, the waste may be justified by the nature or requirements of the job, especially where the segments are wide and the flat grain is to be exposed in the finished work.

Precut segments: Precutting to the circular shape is a preferred method in nearly all production and pattern work involving segmental construction. In this procedure the segments are cut on crescent curves, the same radius being used for cutting the inside and outside edges of each segment, Fig. 12. This gives a perfect outer circle when the segments are assembled, but results in an imperfect inner circle. In some types of work this is of no importance, but when both sides of the assembly must be finished, the inside edge is easily jigsawed to form a true circle.

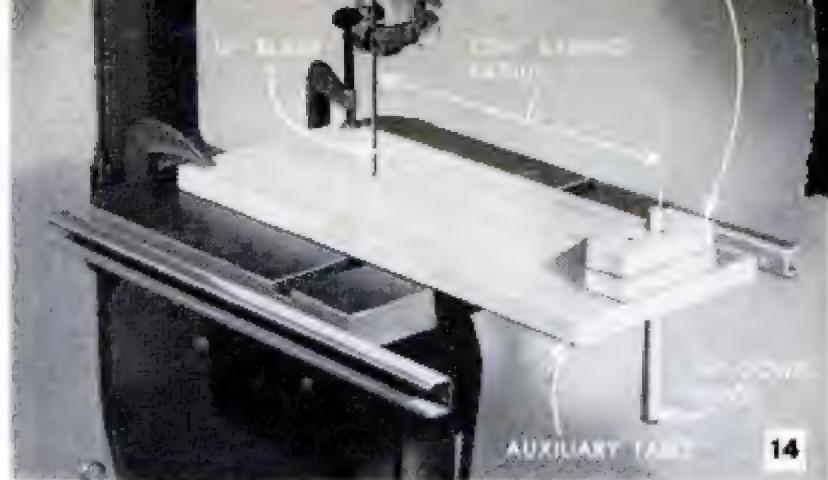
Cutting same-radius segments: The curved rail of the drum table, Fig. 1, is an example of this work. Here the job calls for a built-up

ring, 24 in. in diameter and 3 in. deep, which forms a core for veneering. The form is made up with six curved segments stacked, or laminated, to four thicknesses to obtain the required depth. Fig. 13 shows such a job dimensioned net, but note in the lower detail in Fig. 13 that about $\frac{1}{8}$ in. is added for trim, thus the actual working radius would be approximately $12\frac{1}{8}$ in.

Using these dimensions as a working basis set up the bandsaw as in Fig. 14, and then make the T-pivot as in Fig. 15. Note in this detail that the crossbar, or stop, is the same length as the work, and that stock of the width given will cut five segments. When it is necessary to speed up the job it is entirely practical to cut two thicknesses, as in Fig. 5. Note also in Fig. 15 that the sawing radius, plus $\frac{1}{16}$ in. locates the first pivot hole. The $\frac{1}{16}$ -in. allowance keeps the blade inside the line. Ordinarily the pivot-hole spacing should be a trifle more than the segment width.

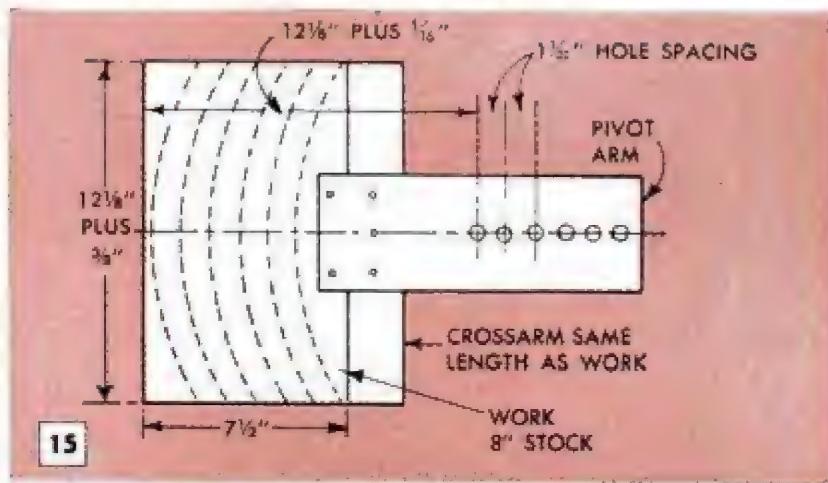
Trimming ends of segments: When cutting the final segments of an assembly, skip the first pivot hole to make a guide piece as in Fig. 16. Attach a wooden strip to the circular-saw miter gauge, then toenail the curved guide to it as in Fig. 18. The guide should be located so as to permit trimming one end of each segment. Now, trim one end of all segments. Then tack a stop to the guide as in Fig. 19, to set the trim length for the opposite end of each segment. It is necessary to be exact in this setting, as for any specified radius you must have the same proportionate side length to obtain a perfect fit. Using a $12\frac{1}{8}$ -in. radius, the side length should also be $12\frac{1}{8}$ in., Fig. 17. The matching dimensions apply only to a six-sided figure. For other polygonal forms use the multiplying factor for an outside circle to get the segment length.

Assembly of segments: If the built-up form must be turned, it's a good idea to lay

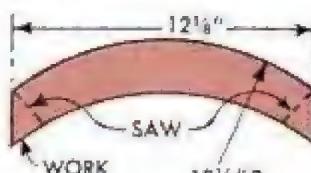
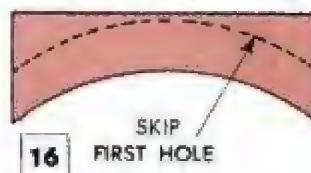


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In order to work circular segments on a small bandsaw, an auxiliary table carrying the pivot pin is clamped to the bandsaw table. Two raising blocks are required for two thicknesses

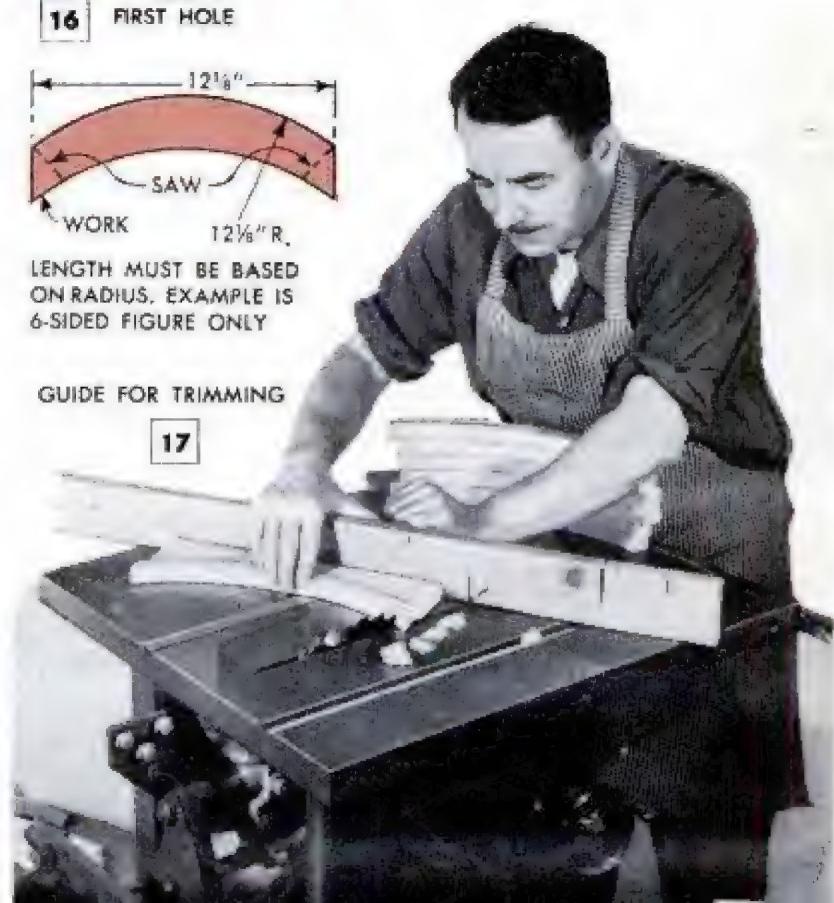


OUTSIDE PORTION OF WORK PIECE PROVIDES JIG FOR TRIMMING ENDS. IT IS NAILED TO MITER-GAUGE FACING. GAUGE IS SET AT 60° (FOR 6-SIDED FIGURE)



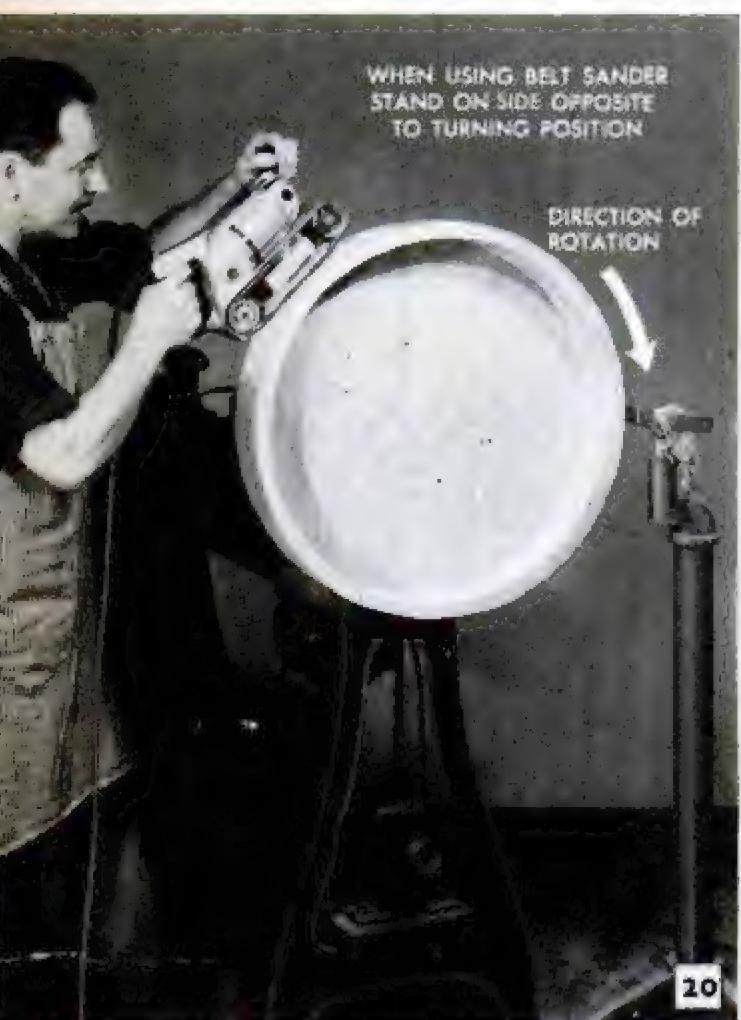
GUIDE FOR TRIMMING

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19



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21

it up on a disk cut from $\frac{3}{8}$ -in. plywood as in Figs. 21 and 22, the first course of segments being glued to the disk with a sheet of paper between. The paper "shim" permits easy removal of the work from the disk when the finishing operations are completed. After turning in the lathe at slow speed, the outer face of the ring can be sanded as in Fig. 20.

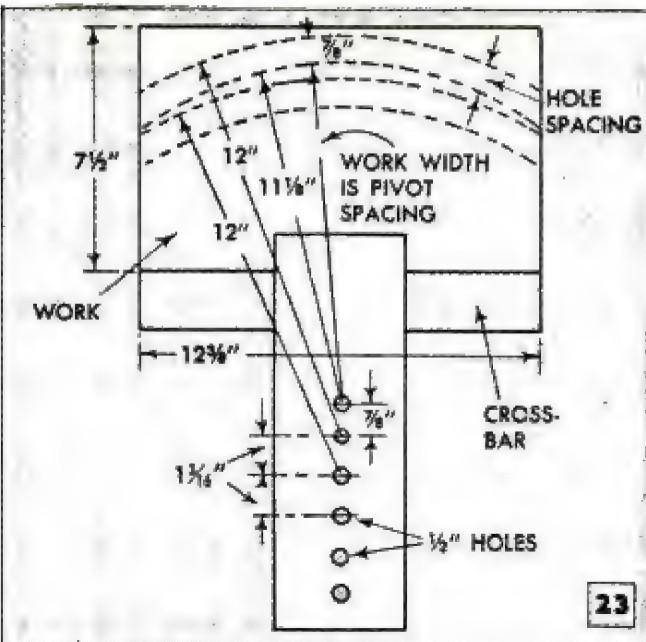
Two-radii segments: When the inner and outer edges of the segments must form a perfect circle, use the setup shown in Figs. 23 and 24, or, if you have the fittings pictured, you can set up the jig as in Figs. 25, 26 and 27. The auxiliary wooden table is clamped to the bandsaw table and the outer pivot hole is located at the required radius to cut the outer edge of the segment. The hole spacing on the pivot arm must be somewhat greater than the width of the work, and the best way to determine this accurately is to make a full-size layout, Fig. 23. The pivot pin is inserted from the top of the pivot arm, Fig. 24. In cutting the outer radius, the pin is inserted in the first hole (nearest the crossbar) and into the outer pivot hole. Then the pin is inserted in the inner pivot hole to cut the inner radius. Repeat for the second segment, using the second hole. Note that this procedure leaves a thin curved strip of waste between the segments. The alternate jig, Fig. 25, also Figs. 26 and 27, is somewhat faster in adjustment. It is built up from standard hold-down parts supplied as circular-saw accessories.

Single-thickness work: All the work so far described has been laminated, consisting of several thicknesses built up with the joints broken like those in a masonry wall. When a segment ring is to be made up in

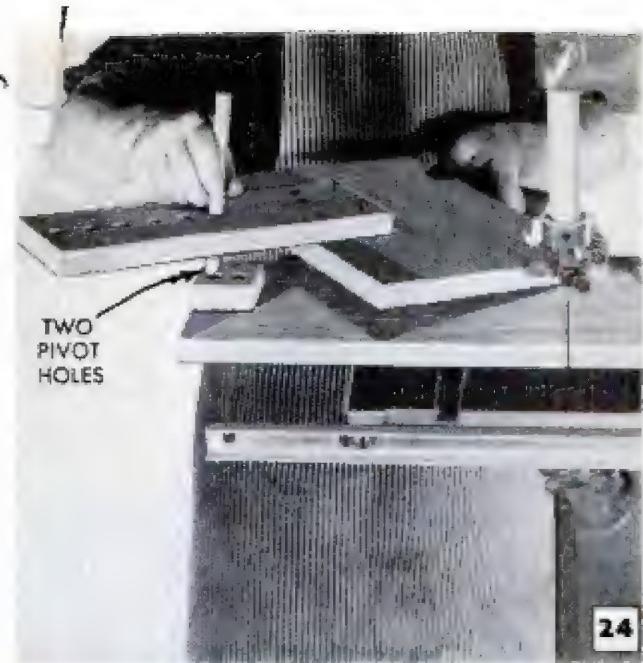
Lower photos show method of building up a ring of circular segments laminated to three thicknesses. Lower row of segments is tacked to a plywood disk



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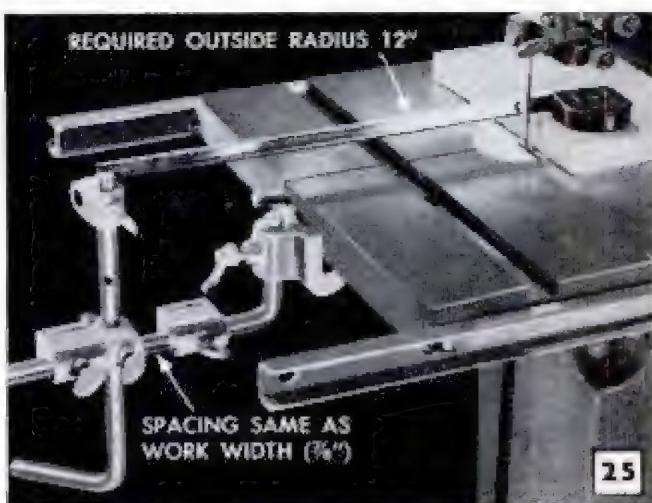
24

a single thickness of stock, the miter joints are strengthened with splines or dowels. In this work the miter angles are somewhat more critical. It's a good idea to first run a few test segments in waste wood to be sure of correct fit.

In all work of this type it is essential that both the bandsaw blade and the circular-saw blade be correctly set and filed with the teeth jointed to a uniform height. If the bandsaw blade runs out even slightly, you are likely to have trouble cutting same-radius segments, and if the circular-saw blade is dull or improperly sharpened this condition is likely to cause the stock to creep when making miter cuts. Also, it is necessary to make sure that the pivoted jigs are centered with the bandsaw blade to prevent binding of the blade when making the curved cuts, especially on short-radius segments. Be sure the setting is correct before starting the machine. ★ ★ ★

Here the first cut has been made to remove the waste piece and the second cut to form the segment is in progress. Note the position of the sliding pivot

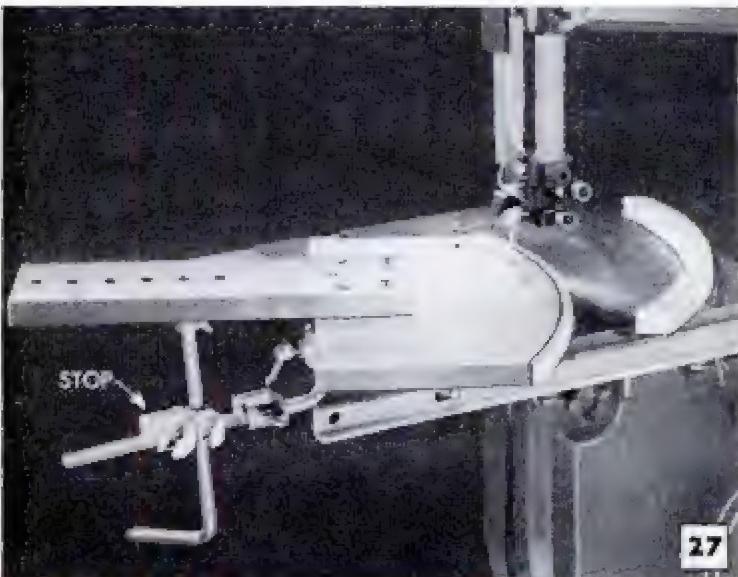
When two radii are used segments will laminate with the inner and outer edges forming perfect circles. Pivot pin is worked alternately in two pivot holes



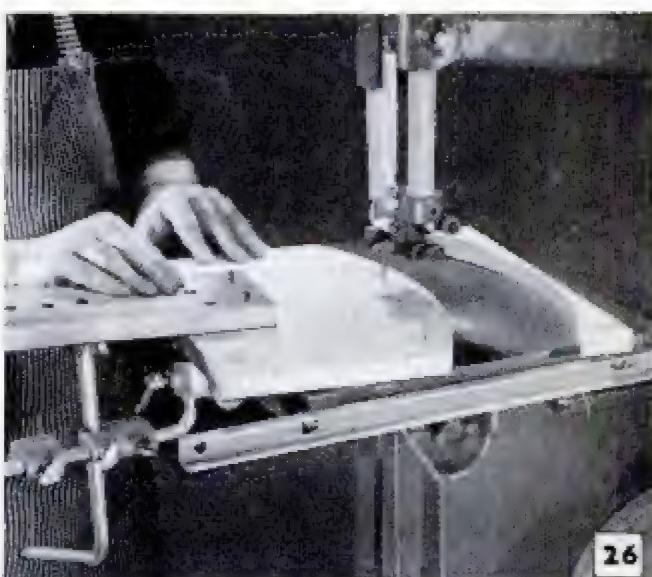
25

Another setup for dual-radius sawing, using standard hold-down parts supplied as circular-saw accessories. Unit has adjustable stops for locating the pivot

In this step one segment has been cut and now the waste piece is being removed by a third cut all the way through. Again note position of sliding pivot



26



27

Hydraulic Cylinder on Wagon Speeds Dumping of Load

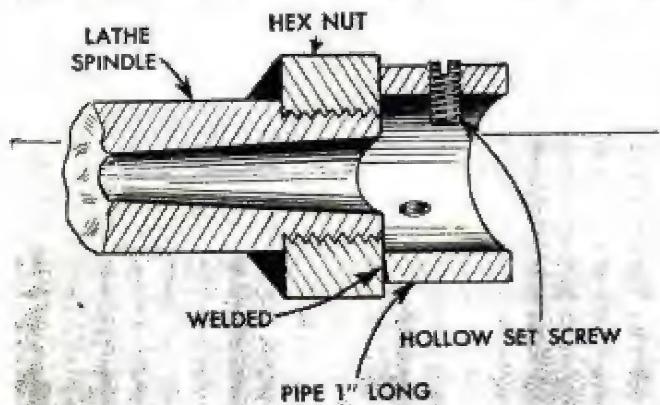


By mounting a hydraulic cylinder on the front end of a wagon, one farmer makes quick work of dumping loads of cut silage, small grain, ear corn, etc. Installed on the chassis frame, the cylinder is positioned so the piston will thrust against a cable secured to the upper end of the cylinder and also to the end of the wagon-bed frame. The cylinder is operated by attaching it to the hydraulic system of a tractor.

John Krill, North Lima, Ohio.

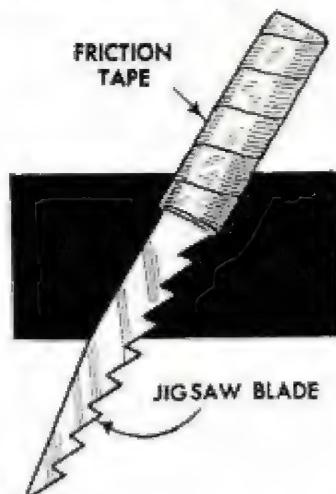
Oversized Chuck Improvised From Pipe and Hex Nut

Lacking a hand-type chuck large enough to hold short lengths of dowel for turning on my lathe, I improvised one from a piece of 1-in. pipe and a large hex nut that fitted the lathe spindle. The pipe was drilled and tapped to take three equally spaced setscrews for gripping the dowel, after which it was welded to a standard $\frac{3}{4}$ -in. hex nut. In use, the hex nut is threaded on the spindle, and the dowel is held in the pipe by the setscrews.—H. Cowan, Clinton, Iowa.



Saw-Blade Tool Removes Key

The tip of a key broken off inside a car-door lock, or other tumbler-type lock, may be removed easily by using a tool improvised from a jig or coping-saw blade. The tool is made by grinding the end of the blade as shown, and then wrapping tape around the opposite end to provide a handle. In use, the tool is inserted in the lock so the beveled upper edge of the blade raises the first tumbler sufficiently to allow teeth on the lower edge of the point to be hooked into the broken piece for withdrawal.—J. R. Paquin, Worcester, Mass.



Gravel Speeds Lowland Drainage

Discovering that a certain section of bottom land still remained wet after drain tile had been installed, one farmer dug down to the tile at intervals of 10 to 15 ft. and placed a shovelful of gravel over each of the tile joints exposed, after which the soil was replaced. The gravel prevents the wet soil from becoming packed around the joints, thus increasing the efficiency of the system sufficiently to drain the area and allow it to dry.

Grooved Distributor Shaft Prevents Oil Seepage

On certain makes of older cars, oil from the crankcase has a tendency to work up into the distributor, usually as a result of wear in the distributor shaft. One way to remedy this until permanent repairs or replacements are made, is to grind or file a groove around the shaft so that it will spiral downward as the shaft rotates. Thus, the groove will carry excess oil back into the crankcase. At the point where the shaft fits inside of the bushings, the groove should encircle the shaft twice.



Floating Tractor Saw Cuts Stumps Underwater



To clear a shallow lake of tall stumps which remained as a hazard to boating when the water was impounded by damming cutover swamp land, the owner floated a tractor and saw on a barge consisting of a heavy platform lashed to oil drums. To support a small tractor of the type pictured, fourteen 55-gal. drums placed under the platform in two rows of seven drums each were found sufficient. A larger tractor, two-plow size, would require a minimum of 20 drums, with 24 drums giving a more ample safety margin. When selecting the drums be sure that each is airtight and watertight. The platform should be constructed of heavy stock and braced so that it will support the tractor without springing or buckling under the weight. Have several bags of sand handy to "trim" the barge so that it will float level with the tractor blocked in working position near

one end. The saw used is of the universal tractor-mounted type having a swiveling joint at the bevel-gear housing, which permits the blade to be operated in either the vertical or horizontal position. In order to locate the saw at the depth required, it is necessary to extend the swiveling section of the arbor by means of a special housing. A new arbor and arbor bearing must be fitted into the substitute housing. In use, the tractor is securely blocked in position on the barge with the wheel brakes locked. Then the barge is trimmed with the sandbags so that it floats level. One man operates the tractor and saw, while another controls movement of the barge by poling as pictured. In some cases two men with poles will be required to ease the barge into position and feed the underwater saw uniformly into the cut.

Perry S. Graffam, Chicago.

Wall-Supported Pipe Rails Aid Cleaning Farrowing Pen



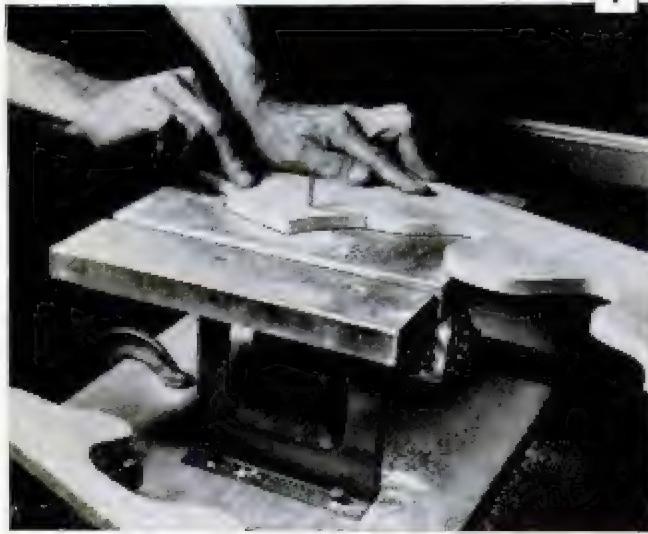
Assembled from lengths of pipe and pipe tees, the rails in this farrowing pen not only prevent a sow from crushing her young, but also improve sanitation by providing an unobstructed floor area that is easily cleaned and aired. The side rails are supported at the front of the pen by brackets formed from automobile-spring leaves that are bolted to side partitions. The opposite ends of the side rails are turned into pipe tees that connect to other lengths of pipe to form the back rail. Ends of this rail are inserted in holes in the side partitions for added support.

SHOPPING FOR TOOLS



1

1. PORTABLE JIGSAW does work of several machines. The hand-held unit makes curved cuts in hard and soft woods, nonferrous metals and plastics. Works in places inaccessible even to a keyhole saw. Makes pocket cuts in 1-in. stock without a starting hole. The motor housing is made to serve as a handle and the wide shoe steadies the units so that cuts square with surface are made easily. High speed of the blade results in extremely smooth work, requiring very little sanding. When mounted in an accessory table as in the lower photo, unit does accurate crosscutting, ripping and angle sawing with the guides supplied



2

2. CARBIDE-TIPPED PENETRATING END MILLS are designed to penetrate and cut laterally in such operations as routing and also face and slab milling in nonferrous metals and nonmetallic materials. Furnished in three-flute types for soft metals and in two and six-flute types for machining steel and harder metals



2

3. VIBRATION MEASURING INSTRUMENT locates the source of unwanted vibrations and then measures amplitude and rate by means of a "tuning" slide and vibrating reed. Movement of tuning slide to give maximum throw of reed results in a direct scale reading which is multiplied by 1000 to give cycles per minute



3

4. DETACHABLE POURING LIP fits 1-gal. paint containers having friction-type lids. To use, just remove the can cover and press the pouring lip in place. Permits pouring paint from one container to another without spilling. Paint in container can be stirred with paddle without splashing. Made of plastic. Easy to clean



4

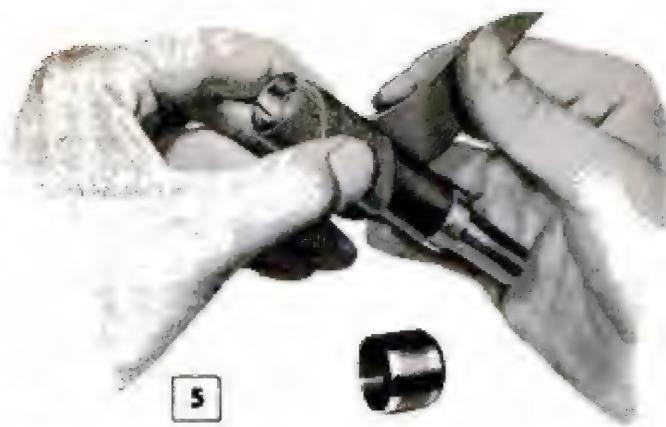
5. SMALL-DIAMETER SANDING SPINDLES come in sizes from $\frac{1}{4}$ in. to 1 in. and are designed for chucking in drill press, flexible shaft, lathe or portable drill. Spindle is fitted with specially made locking device that makes it possible to use strips cut from ordinary sandpaper of any grade desired. Strips are spirally wrapped around the spindle and securely locked at both ends. Smallest size will work in any intricate jigsawed scrollwork having radii as short as $5/16$ in.

6. COMBINATION GRINDER-HONE provides small shops with complete grinding equipment for all types of edge tools. When belted to a small motor the abrasive wheel is driven at a speed of 3000 r.p.m. while the circular hone, which is geared to the wheel spindle, rotates at 110 r.p.m. Hone is sandwich type, providing grit No. 120 for whetting and No. 320 for honing. Hone is driven in a friction cup and is reversed simply by lifting it out of the holder and turning over

7. UNIVERSAL HANDLE for go and no-go gauges permits the user to make up multiple combinations for fast, accurate checks at the inspection bench or at the machine. Eight handles in a set will accommodate a range of plug gauges from .010 to .750. Handle is hexagonal in shape to prevent it from rolling off the bench and damaging the gauges. It is made of anodized aluminum and is fitted with "chucks," or collets, at each end which permit adjustment of gauges

8. LADDER CADDY attaches to stepladder by means of a metal bracket. Has a tray for small tools, screws, nails, brushes. An opening in the tray holds a can of paint and a rod swinging below the tray carries a number of sliding hooks for large tools. There's also a ring for the dustcloth. Anyone who works from a stepladder will quickly appreciate the saving in time and steps effected by having all the necessary tools within easy reach from the working position

9. NAIL HOLDER saves time and eliminates finger bruises when starting nails in places ordinarily difficult to reach. Electricians find it handy for starting nails in outlet boxes, carpenters and finishers use it both as a holder and driver when working in close quarters. Holds almost any type of nail, even roofing nails, in position for starting, and is used as a driver in places inaccessible to the hammer. Head of nail is held securely in a milled slot



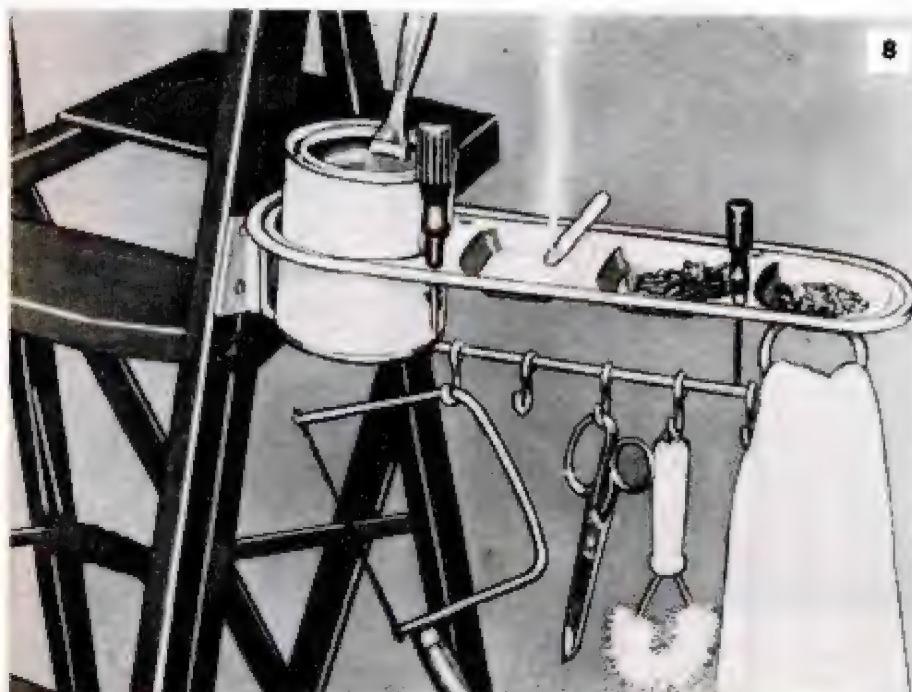
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6



7



8



9

Mechanical Hoe Weeds Raspberry Field Faster and Cheaper



One berry grower has designed a mechanical hoe to cut the cost of weeding and hoeing his raspberry fields. The operation now requires only two men and a few days time, where before as a hand operation, the work of ten men for four weeks was needed to finish the job. The hoe itself is a disk with six steel teeth extending downward from it. The power is supplied by a $3\frac{1}{2}$ hp. gasoline engine, which drives the hoe through a right-angle drive unit improvised from a small automobile differential. The assembly is carried on a frame mounted on the tractor drawbar. One man drives the tractor and the second guides the hoe.—Bill Dugovich, Tacoma, Wash.

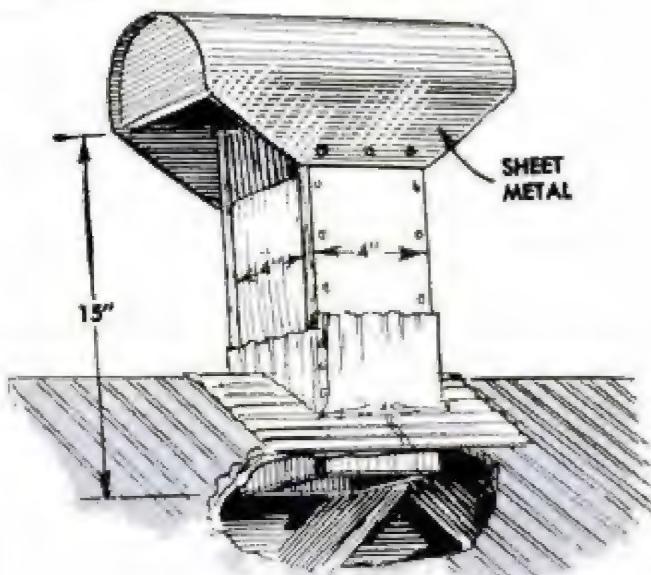
Ventilator Provides Circulation for Low-Roofed Cattle Shed

This improvised ventilator is one farmer's answer to the problem of providing adequate ventilation in a low-roofed stock shed. The vent is an open-ended box made of 1 x 12 lumber, two sides being 3 in. longer than the others. The top end of the box is covered with sheet metal. The ends are reinforced with rounded pieces of 1 x 4 lumber. To install, a hole is cut in the roof next to a rafter to which the ventilator is nailed. It is cross braced on the opposite side and flashing is then nailed around the base of the ventilator.

Stub Shafts on Wooden Roller Improvised From Lag Screws



Drilling a hole for a shaft through the entire length of a wooden roller to be used as a sander drum or conveyor roller is unnecessary, if the ends are drilled to take stub shafts improvised from lag screws. This is done by sawing off the head of each screw after it has been inserted, and then rounding the end with a file. The screws should be centered accurately in order to minimize any tendency of the roller to wobble when rotated. If a metal-turning lathe is available, wobbling may be eliminated by first rough-turning the roller, inserting the shafts and then mounting it in the lathe



again, this time supported by the shafts for finishing. Or, if a roller has been rough-turned on a wood lathe for use as a sander drum, the shafts can be inserted and the roller mounted in the sander-drum bearings for truing with a turning tool.

Dick Hutchinson, San Gabriel, Calif.

Alcohol Simplifies Cutting Of Auto Safety Glass

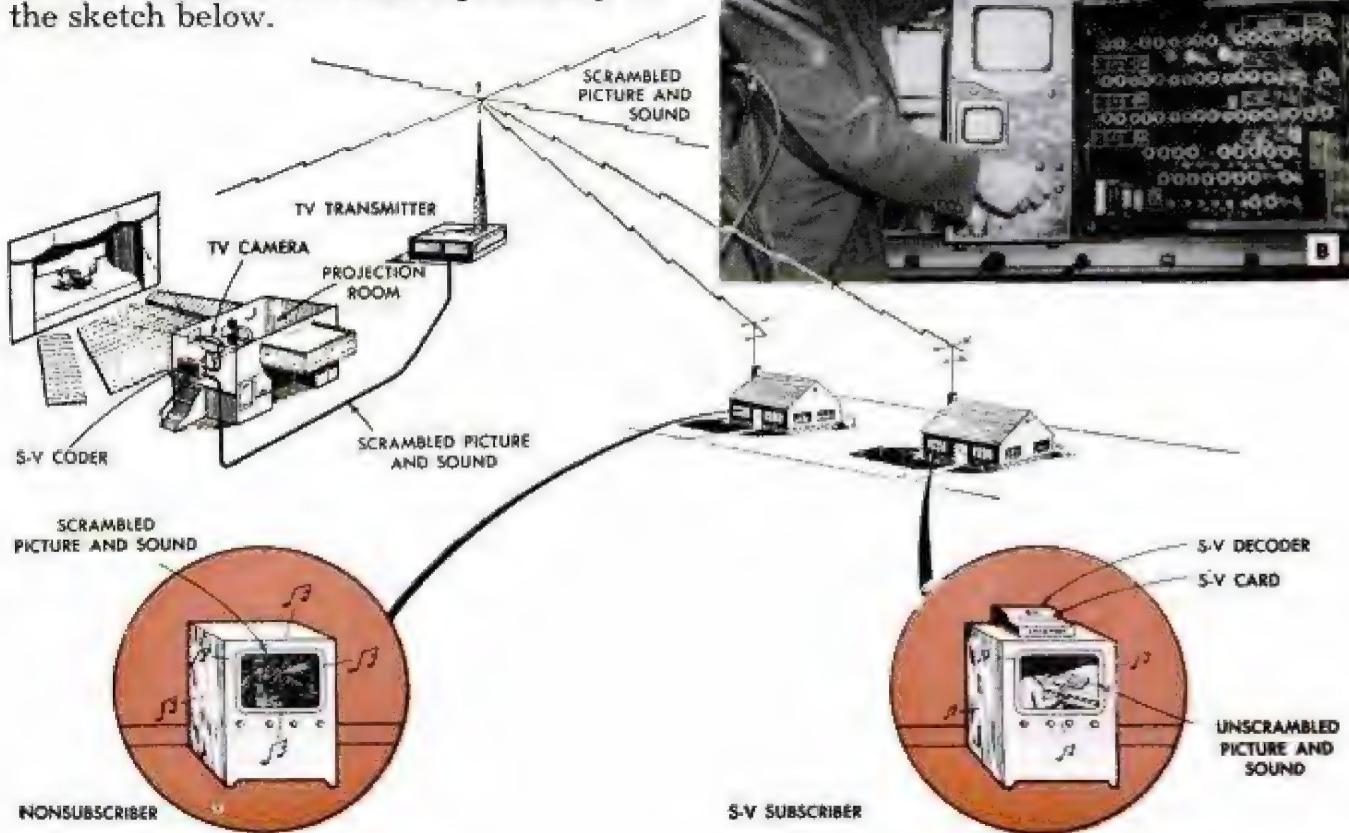
The difficult job of cutting safety glass in the small shop can be made easier if alcohol is used to dissolve the "plastic" between the glass sheets. First scribe the desired pattern on both sides of the glass and then carefully break the glass, one side at a time. When the two sides have been broken along the scribed lines, pour a small amount of alcohol into the crack from one side only. The alcohol softens the plastic after a few moments, making it easy to remove the surplus glass by applying pressure to the unwanted sections.

John Devlin, Merrick, N. Y.

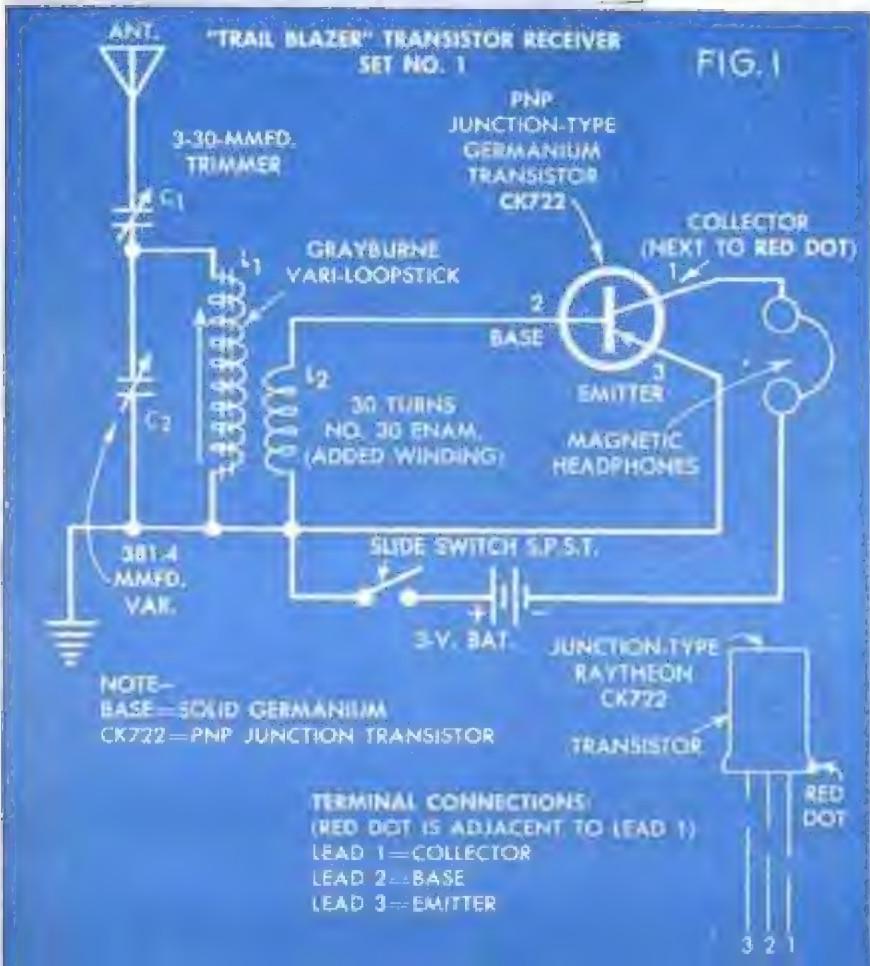
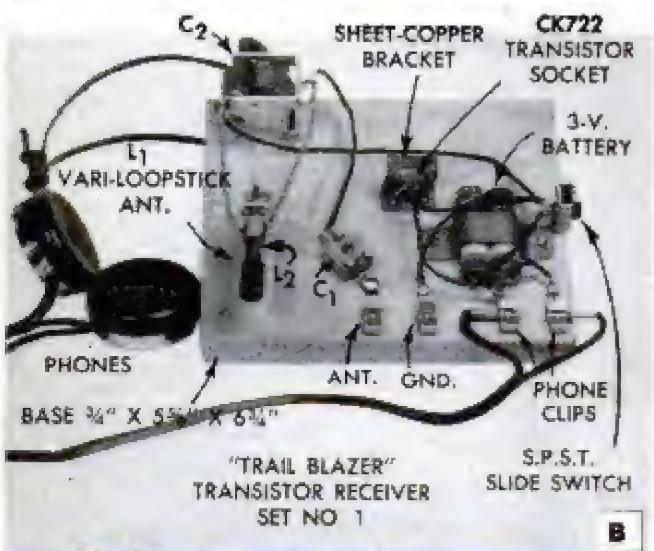
TV-SUBSCRIBER SYSTEM

SUBSCRIPTION-TELEVISION is proposed to bring to millions of TV set owners many additional opportunities and choices in entertainment and education which they do not now enjoy. One of the new systems to bid for the approval of the Federal Communications Commission is known as Skiatron's Subscriber-Vision. This system, recently given operational tests in cooperation with station WOR-TV New York, is claimed to be free from objectionable interruptions. The subscriber will pay only for viewing the special S-V (Subscriber-Vision) program he selects.

Signals are transmitted by the TV station through an electronic unit known as the coder. This unit, illustrated in the photo B, scrambles the TV waves. Each subscriber will have one of the small electronic units shown in photo A. This decoder unit, which can be connected to a standard TV receiver, has a slot in its top for the insertion of a special subscription card on which is listed the weekly programs. To connect the decoder for a specific program, the card is inserted and the proper button on the front of the decoder is pressed. This punches a hole in the card and completes the circuit. The new system is detailed pictorially in the sketch below.



HOW TO BUILD EXPERIMENTAL



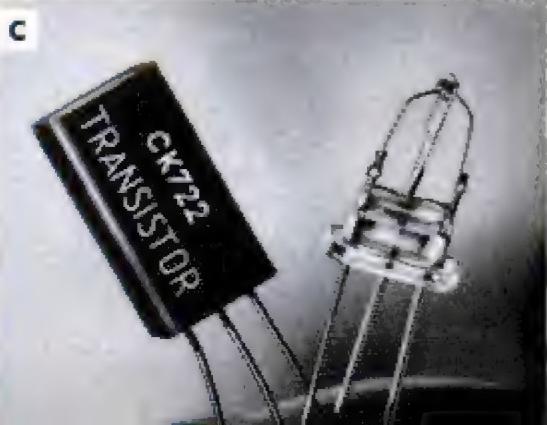
TRANSISTORS were developed by the engineers of the Bell Telephone Laboratories in a series of experiments with germanium that began in 1948. The original contact types were used to replace tubes in certain telephone and radar applications, but they were highly variable in their characteristics and of uncertain reliability.

Under the direction of Dr. William Shockley and J. A. Morton, an improved unit known as the junction type was developed, and this new unbelievably small, low-voltage amplifying device was announced in 1951, and described in *Popular Mechanics Magazine*.

The transistor is the first practical solid device that, like the vacuum tube, could amplify an electric signal. The new Raytheon CK722, photo C, junction or "sandwich" type used in these experimental receivers has recently been made available to students and experimenters. Transistors are still in limited supply and quite expensive, this CK722 junction type being one of the least costly.

These experimental transistor receivers are for the dyed-in-the-wool experimenter. Please remember, that transistors are still in the experimental stage although they replace tubes in some special, commercial applications.

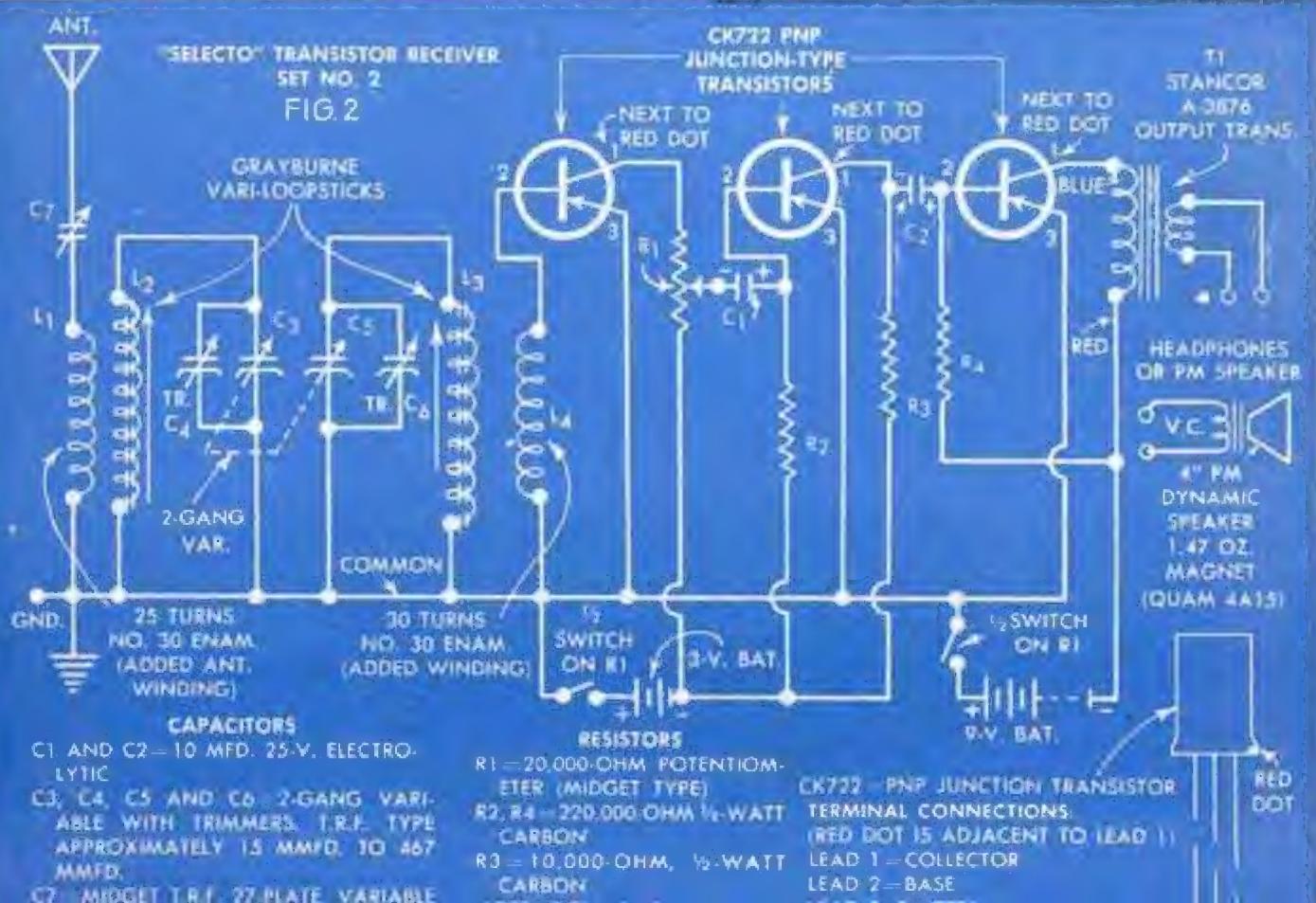
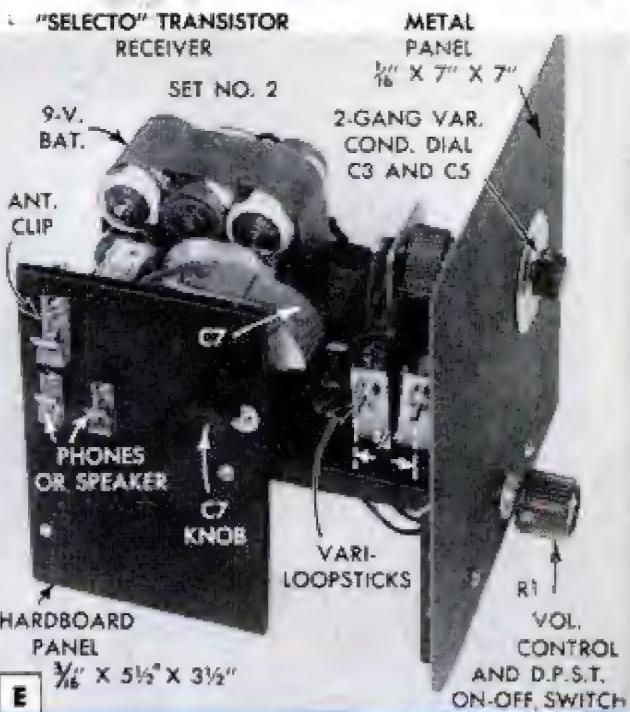
Set No. 1, photos A and B, Fig. 1, is a very simple transistor receiver for headphones only. It will receive local broadcast stations with comfortable volume. It uses a vari-loopstick antenna coil, with an added winding wound right at the end of the raised cardboard cylinder. Once the wiring is completed, check the set over very carefully. Mark the transistor socket to properly position the transistor in relation to the red dot. If the transistor is inserted in reverse it will be ruined. Check and recheck leads 1, 2 and 3.

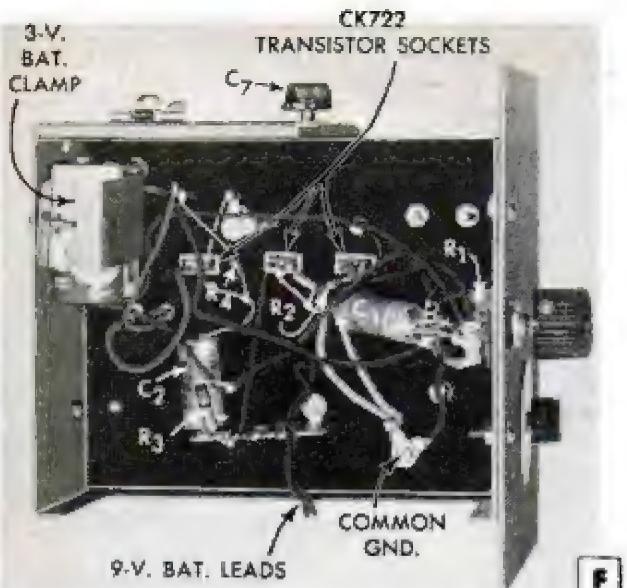


TRANSISTOR RECEIVERS • • •

before throwing the switch. The outdoor antenna should be at least 75 ft. long. The antenna trimmer condenser C1, is adjusted for best volume, and all tuning is done with the main variable condenser.

Set No. 2 is definitely not for beginners, and even greater care should be taken not to accidentally reverse any of the transistors in their sockets. These CK722 junction-type transistors cost \$7.60 each, and a wrong circuit connection, or a reversal would be an expensive accident. All specifications are given in Fig. 2. A long outdoor antenna, and a good ground should be used. Set condenser C7 at half capacity, and turn the set on. Rotate the 2-gang variable condenser to a station on the low end of the band and adjust the slugs in the vari-loopsticks for maximum signal. Antenna coupling is critical; load up right to point of distortion. Next tune to a station on the high end and adjust the trimmers (Tr.) for maximum signal on that end. Transistors are essentially voltage amplifying devices, and not capable of a great amount of power; but they have amazingly low battery drain and real gain on low voltage. The volume of the detector-amplifier 3-unit set cannot be compared to even a 2-tube receiver, but it is sufficient for a small room. Study diagram Fig. 2, and photos D, E, F, G and H carefully. The loud-speaker should have a very large baffle.





Omit output transformer if headphones are used, and connect as in Fig. 1.

Transistor theory represents a radical departure from vacuum-tube theory. Space does not permit a complete theoretical explanation, but sketch Fig. 3 illustrates the basic idea of the point-contact type. The arrangement shows a small block of semiconductor material (germanium) placed in electrical contact with a conducting metal base which is then grounded, as shown at 2. On top of the block, spaced a few thousandths of an inch apart, are the two cat whiskers 1 and 3. Collector cat whisker No. 1 is negative with respect to the germanium block by virtue of the high-voltage battery (about 10 volts). A milliammeter is shown in series with this connection. Observing the sketch, it appears that the electrons flow from the collector cat whisker (1) to the base (2) within the semiconductor material under the influence of this applied battery voltage. The electron flow produces a meter reading. High gains are possible because of the very high ratios of output circuit to input circuit impedance. Emitter cat whisker (3) is at opposite polarity to collector (1) as it connects to the positive side of the low-voltage battery. When switch (SW) is closed, a meter placed in this circuit would indicate a current in the No. 2 to No. 3 circuit. Since the diode (cat whisker) on the No. 3 side is connected in the forward (low resistance) direction, a very small potential at low-voltage battery will cause current to flow. A study of the current flow cannot be explained on the basis of electron flow alone. A new concept of "hole conduction" must be adopted to understand transistor action. When the switch is closed, the positive plus signs indicate positively charged "holes" that migrate from emitter No. 3 to collector No. 1.

The internal construction of the new PNP junction type is illustrated in Fig. 4. It differs from the point-contact type in that the rectifying barrier layers are formed by boundaries, or junctions, between different types of germanium semiconductor material.

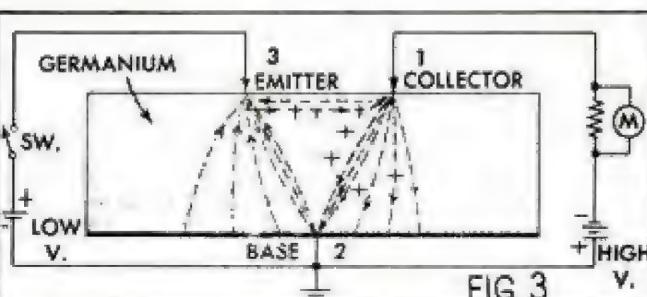
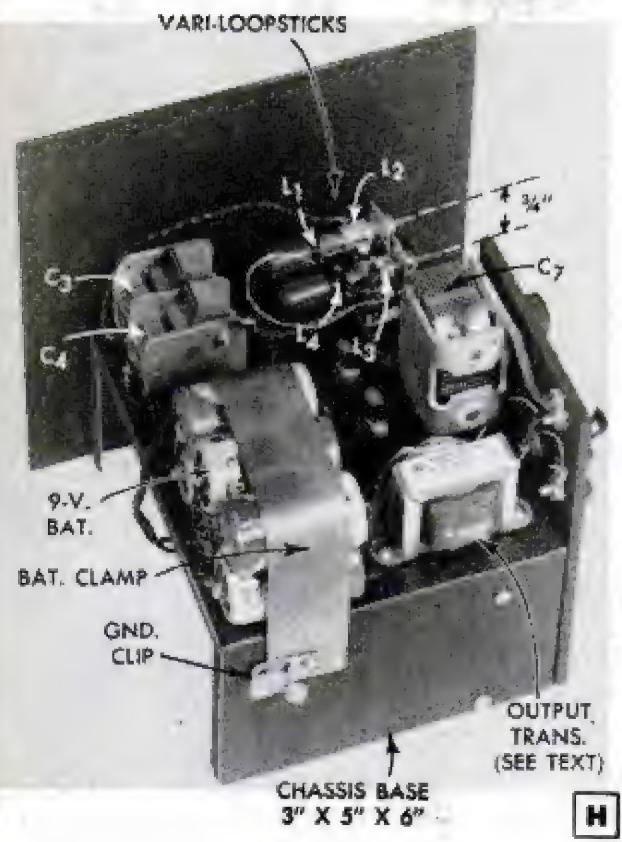


FIG. 3

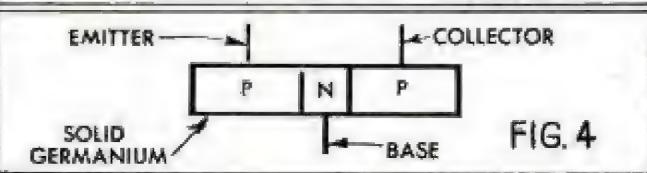


FIG. 4

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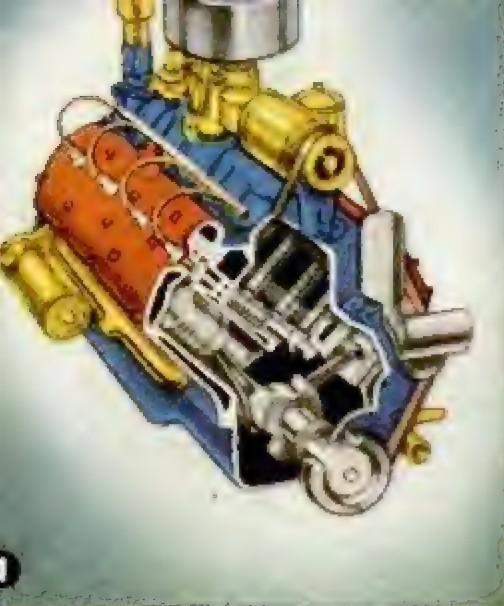
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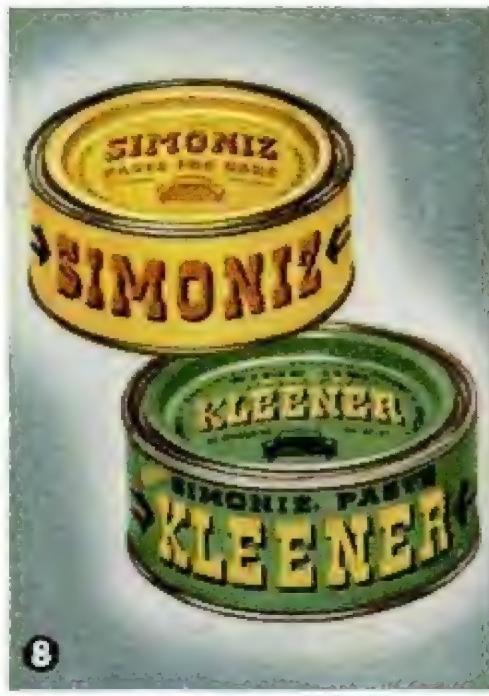


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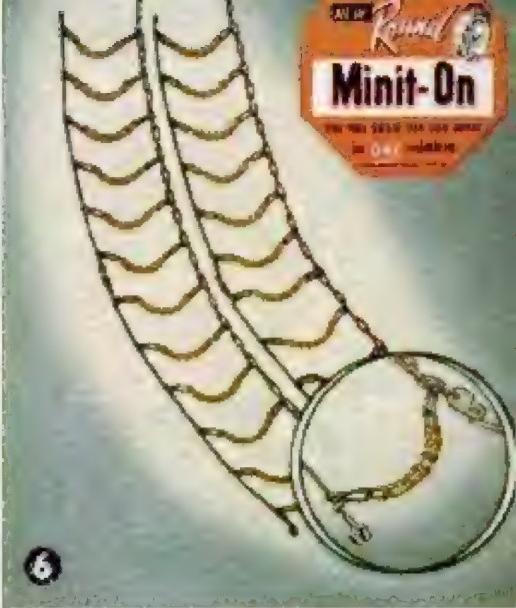
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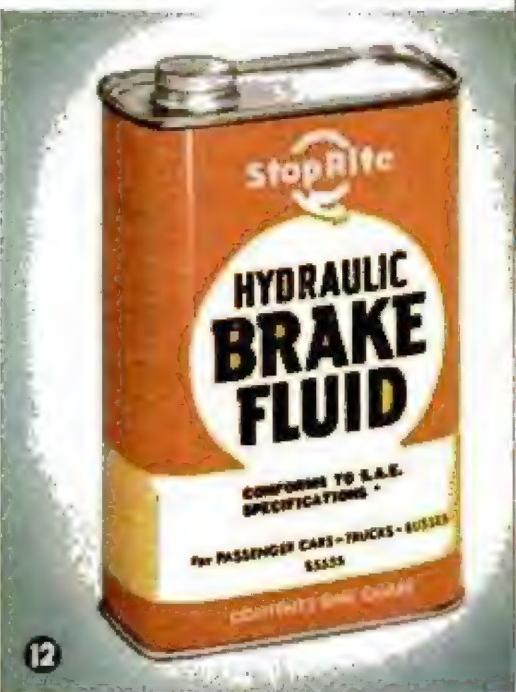


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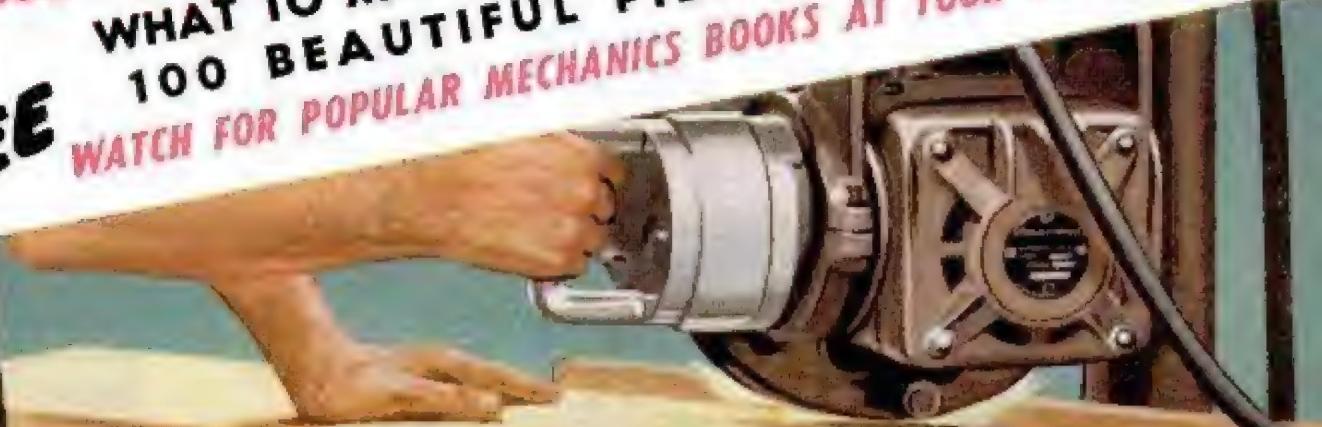
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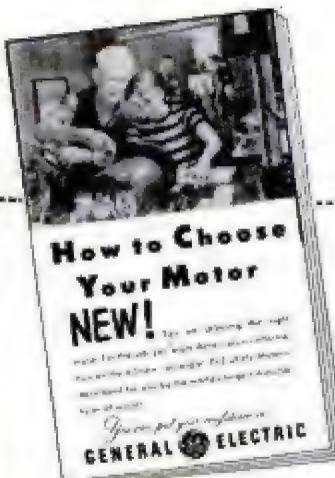
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Now available through your local dealer —the completely new G-E Utility Motor gives you more for your motor dollar! Packed with more power per pound, it's smaller, lighter, easier to handle, mount and wire! You can use it with shaft up,

down or at any angle — it will maintain the right lubrication and *no oil leakage!* Designed for home workshops by the world's biggest motor manufacturer, why take less? Ask your dealer about the all-new G-E Utility Motor today!

You can put your confidence in—
GENERAL ELECTRIC



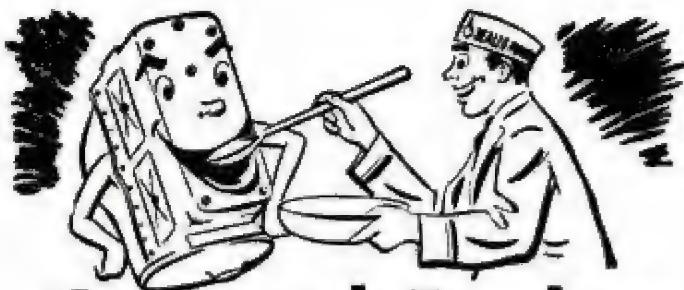
FREE

Section 674-167, General Electric Co., Schenectady 5, N. Y.
Send me the new 16-page booklet that gives general tips on motor selection and tells about the all-new G-E Motor.

Name _____

Street and address _____

City _____ Zone _____ State _____

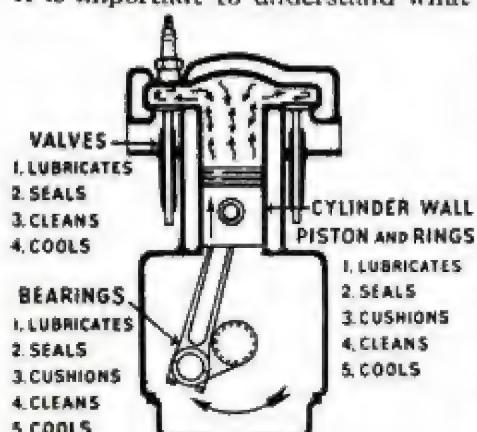


Care and Feeding of Engines

BY S. P. CORP

HOW OFTEN TO CHANGE OIL?

Operating conditions have a lot to do with the need for oil changes in your engine. To judge conditions, it is important to understand what the oil must do.



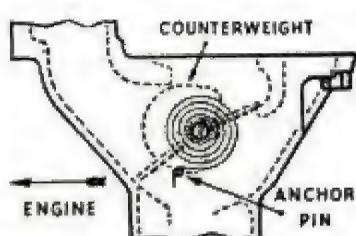
OIL AT WORK

Frequent starting and stopping without giving the engine time to heat up is rough on oil. So is long idling. A cold-running engine is hard to lubricate and contaminates oil quickly. The engine that is driven a long time at an average speed in hot weather is using oil under the most favorable conditions.

To make oil last longer and to increase engine life (1) keep the oil filter clean, and (2) be sure the engine thermostat is set for 160 to 170° F.

OVERHEATING

Overheated fuel mixture causes loss of power. Check the thermostatic manifold heat control valve in the exhaust manifold below the carburetor. This valve deflects hot exhaust gases to the intake manifold when the engine is cold, and changes position as the engine warms up, leading the hot exhaust gases away. If this valve sticks in the cold position, fuel mixture becomes overheated. Operate valve by hand to see if it moves freely. If it does not, a few drops of acetic acid or vinegar should clear the shaft. If it does not, remove manifold and have condition corrected.



SEND FOR FREE BOOKLET

You will find many helpful ideas on car care in the new free illustrated booklet "MORE POWER, Less Oil, Less Gas." Address a post card to Sealed Power, Dept. G-10, Muskegon, Michigan, for your copy. And be sure to use Sealed Power KromeX Ring Sets when you re-ring. These are the finest piston ring sets ever made, and include the famous MD-50 Steel Oil Ring, best for oil control even in badly tapered and out-of-round bores.



Clinic for Homemakers



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—the editors of Popular Mechanics invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, Ill.

Tile Joints Open

Q—Recently I laid a cork-tile floor in my new home, and lately I've noticed that the joints are opening between the tiles. The tiles are laid on a wooden subfloor. The open joints are irregularly spaced, some still remaining tight and others opening as much as $1\frac{1}{8}$ in. Judging from the appearance of the floor, it looks as though the whole thing would have to be relaid. But what has caused the trouble, and is there any simple remedy?—W. T., Miss.

A—At this distance it is impossible to say with certainty what is the cause, but we're going to guess that the opening of the joints is due to shrinkage of the wood in the subfloor. Unfortunately there is no simple remedy if this is the case. About the best you can hope for is stabilization of the wood at some point where no further shrinkage will take place. However, when this trouble occurs, it often is possible to correct the open joints by re-laying only a part of the floor. Usually the open joints take some pattern, either diagonally or at right angles to the wall, and generally it is possible to work out a procedure for re-laying a certain number of tiles to correct the defective joints. In some instances this will not work out, as the "gain" at each joint will be too great. In this case it is possible to effect a fairly satisfactory repair by patching. At each open joint cut away about $\frac{1}{2}$ in. of the tiles on one side, or alternate sides of the joint. Use a sharp razor blade and a straightedge. Then remove the waste pieces. Cut strips from a cork tile of the correct width to fill the opening. Cement these in place. If care is used to make straight, clean cuts both in the tiles and the strips, the repair will be apparent only on the closest examination.

Renewing Old Luggage

Q—I have two leather bags and a suitcase which seem too good to discard and yet are unfit for use in their present shabby condition. Due to long use, the leather is worn at the corners, scuffed and discolored and seems rather hard and lifeless. Isn't there some way of reconditioning such items—a dye or some similar product that will soften and recolor the leather and improve its appearance? I tried shoe polish but this did not seem to do the job.—T. J., Okla.

A—We are assuming, of course, that you are referring to luggage with coverings of genuine leather, and not to plastic or other imitation-leather coverings. There are several types of permanent leather dyes available, but we are rather doubtful that you would find these satisfactory on leather

(Continued to page 256)



More Room, More Time, More Fun...

All over the house with

TORIDHEET

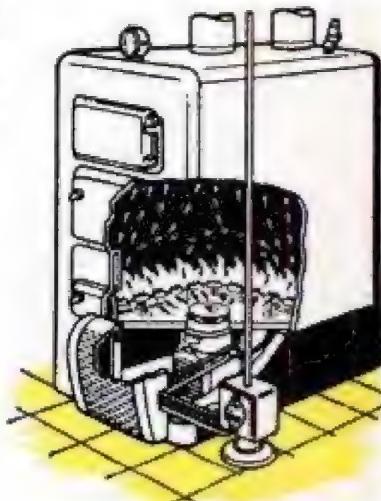
Automatic Heating

You'll have more time for hobbies and outside activities . . . more room for family fun when a compact TORIDHEET unit replaces your antiquated, inefficient furnace and dingy coal bin. For modern TORIDHEET is the work-free, worry-free way to enjoy clean, healthful, even heat simply by setting a thermostat. It's tops for economy, too . . . practically pays for itself with up to 50% savings on fuel and cleaning bills.

Whether you're planning on building or remodeling, there's a TORIDHEET gas or oil unit built to fit your needs. No home is complete without TORIDHEET — Brand New Furnace or Conversion Burner.

**Direct heating action
insures top fuel efficiency**

TORIDHEET'S Wall Flame Burner concentrates an intense-blue flame directly on the heat absorbing surfaces, providing fast, efficient fuel utilization.



SAVE UP TO 50% ON FUEL BILLS — MAIL THIS COUPON TODAY!

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AUTOMATIC HEATING

**TORIDHEET DIVISION
CLEVELAND STEEL PRODUCTS CORP.
7312 Madison Avenue, Cleveland 2, Ohio**

Please rush me complete facts on the TORIDHEET Wall Flame Burner with direct heating action.

Name _____

Address _____

City _____ Zone _____ State _____

No Sanding! No Finishing!



Bruce PREFINISHED Oak Floors

BLOCK, STRIP OR RANCH PLANK — Now it's easy and economical to give your home the new beauty of modern oak floors...with all the glamour of nationally-famous Bruce Prefinished Hardwood! In only a few hours, your living room, bedroom, dining room—or that unfinished room upstairs—will glow with a style as modern as tomorrow. You can choose Block, Strip or Ranch Plank design.

It's EASY! These floors are completely finished—even waxed—at the factory. Just cover old floor or smooth subflooring with felt paper and nail down this highest quality oak (or install in mastic over concrete). No sanding or finishing...no mess or smell. Ready for use as soon as it's laid...and your home will have the rich style and beauty chosen by leading decorators.

It's ECONOMICAL! A new Bruce Hardwood Floor will cost you less than a good rug or carpet...and will last the life of your home. The famed Bruce "Scratch Test" proves this durable finish doesn't scratch, chip or mar. Ask your lumber dealer for an estimate. Mail coupon below for colorful literature.

MAIL FOR FREE LITERATURE

E. L. Bruce Co., Box 397-J, Memphis 1, Tenn.
Send me complete, free information on prefinished Bruce Hardwood Floors.

Name.....

Address.....

City..... State.....

Bruce Hardwood Floors

Product world's largest hardwood flooring maker

(Continued from page 254)

goods in the condition you describe. In order to recondition the leather and conceal defects it will be necessary to use a colored finish containing a pigment in sufficient amount to cover like paint and yet not hide the grain of the natural leather. A flexible leather finish of this type is available, comes in colors and we are told that it has proved most effective in making old luggage look like new. The surface over which it is applied must be clean, dry and free of wax and oil. On old leather goods it is advisable to apply a specially prepared sealer as the first coat, then one or two coats of the finishing material in the color desired.

Refrigerator Cycle

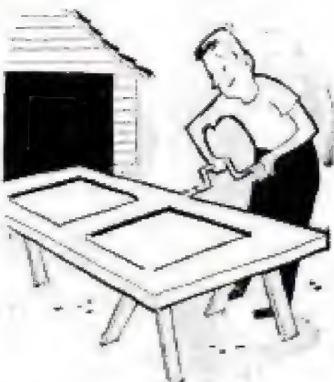
Q—My refrigerator is about 18 years old and lately it is operating almost continuously. It runs for a period ranging from 20 to 30 minutes with only an interval of a couple of minutes or so when it is off. What kind of refrigerant was used? Is it possible for a portion of it to leak out? How can I correct the trouble?
R. B., Kans.



A—We are assuming from your description that your refrigerator is of the mechanical type, that is, the refrigerating unit is electrically operated. After 18 years service it would not be unusual for some minor trouble to develop. You should have the unit checked by a competent serviceman who is experienced in servicing the older models. He will have equipment for checking the pressure on the high and low sides of the lines and also the adjustment of the expansion valve. If the high-side pressure is above normal, this condition may reduce the capacity of the compressor to the point where it is no longer sufficient for proper refrigeration at the regular operating cycle. It may be necessary to purge the unit of air or add refrigerant. High head pressures may also be due to a clogged condenser, that is, the fins are heavily coated with dust and lint. An insufficient charge of refrigerant can cause continuous, or near-continuous operation. Also, the condition of the door gasket should be carefully checked. A leak at the gasket can cause the unit to operate abnormally. Your serviceman can easily determine the type of refrigerant used and can replace any loss.

Hanging Garage Door

Q—My two-car garage has doors of an older type consisting of four sections, or doors, hinged at the center in pairs, each of which fold outward to open. One end of each pair is carried on a hanger which runs in a metal track. Lately, one of the sections which is hinged to the building has sagged and the center and lower joints have opened, making it impossible to fully close the door. Is there a way to repair this defect without dismantling and regluing? I have no clamps.—*M. Y., Conn.*



A—Unscrew the hinges from both sections so that you can remove the defective one and place it on sawhorses. Straighten it by tapping the ends of the stiles. Now, bore 1-in. holes to a depth of about 1½ in. in the edges of both stiles, the holes centering opposite the ends of the rails. Counterbore these holes with a ¾-in. bit through the stiles only. Counterbore again with a ¼-in. bit into the ends of the rails, the total depth of the counterbored holes being sufficient to take a 3/8 x 6 or 8-in. lag-screw. Slip a washer over each lag screw. Then turn the lag screws into the holes with a socket wrench, drawing up the screws until the joints are uniformly tight.

Texaco Tips



on car care



How to get smooth engine performance

Weak or worn out spark plugs make your engine sluggish—waste gasoline, too. To get full engine power and smooth performance, drive in and see your Texaco Dealer for a spark plug check-up. For a nominal charge, he will remove all plugs, clean out carbon and reset the spark gap to the correct specifications. He will replace any worn out plugs. Expert car care like this adds more pleasure to your driving.

How to get that "cushiony" ride

When Marfak is given the "whirl test," it won't pull apart — as would an ordinary grease. That's proof of why Marfak protects your car's chassis longer. It clings firmly to vital points of wear and friction. And Marfak is especially compounded to resist squeeze-out, jar-out and wash-out, too. When you get Marfak lubrication, you get cushiony riding for 1,000 miles or more. For longer lasting Marfak lubrication, see your Texaco Dealer, the best friend your car has ever had.



THAT "CUSHIONY" FEELING LASTS LONGER WITH

THE TEXAS COMPANY
TEXACO DEALERS

in all 48 states

Texaco Products are also distributed in Canada and in Latin America

We Drive a Foreign Car

(Continued from page 141)

ease of parking and the short turning circle (33 feet) are all pleasant and convenient features. On the other hand, the American driver, accustomed to an automatic choke and a fast-warming engine, may have difficulty becoming accustomed to the engine's penchant to conk out at the first traffic light. The engine is "cold" if it hasn't been running recently and for short runs in winter the choke must stay pulled out.

Engine oil capacity is only four quarts. We change it every 2000 miles. Transmission and differential hold one quart each. The only part replacement we have made was a plastic piece for the wiper switch. The only repair job was a broken exhaust pipe and this was welded at a neighborhood garage. We live in a small town that does not have foreign-car service, but have had no problems thanks to the trouble-free operation of the Minx.

In summary, the Minx is not only a different car—it is a different kind of car. While our experience may be illustrative without being typical, we would say after a year with the Minx that if you are stout

Summary of one year's operation

Total mileage.....	10,167
Miles per gallon in Britain (3917 miles).....	26½
Miles per gallon in U.S.A. (6250 miles).....	23½
Miles per gallon on long trips.....	31
License and insurance (Britain and U.S.).....	\$145.40
Gasoline.....	132.48
Lubricants and service.....	26.43
Repairs and replacement.....	12.39
Total expense*.....	\$316.70
Over-all cost per mile.....	3.1 cents
Operating cost per mile.....	1.7 cents

* Depreciation not included.

or tall you would not be happy with it. Nor would you be happy if you like your car to be flattering, to enhance your social prestige or boost your ego. You have to possess a somewhat unconventional spirit to enjoy a small foreign car in the average American community.

On the other hand, if you take just a little interest in the mechanics of your car, if you are willing to take a more active part in driving (shifting more often, for instance), if you don't demand a superabundance of power and competitive acceleration, you could be very satisfied with the small English car.

Moreover, if you happen to be one who analyzes his transportation costs and is

(Continued to page 260)

\$20 Gift Merchandise Certificate WITH PURCHASE OF ANY **SKIL** HOME SAW!



SKIL Home Shop and Builders Saws—World's Finest For Remodeling, Home Construction, Home Workshops

Why be satisfied with ordinary saws when SKIL gives you so much, much more? You get greatest accuracy, maximum ease of handling with SKIL balance. You make fast, easy cuts with SKIL plus power. You make quick, simple bevel or depth adjustments and you're ready for any and every cut needed!

No Other Saws at Anywhere Near the Price Have All These Features!

Oversize Motor • Ball and Anti-friction Bearings • Built-in Bevel and Depth Adjustment • Telescopic Safety Guard Sturdy Die Cast Aluminum Housing • Trigger-type Switch

There are six SKIL Home Shop and Builders Saw models. 6"-7 1/4"-8 1/4" blade sizes. Priced from \$43.95.

Once-in-a-lifetime chance to own a SKIL portable saw... plus a combination table saw, sander and shaper unit... at amazingly low cost!

Want the greatest value for your power tool dollars? Buy any SKIL Home Shop or Builders Saw and you get a Merchandise Certificate worth \$20 on the SKIL Saw Table and Sander-Shaperkit—an unbeatable combination.

You have a *portable saw*—the preferred tool for building an extra room or garage. You're equipped to fit doors and storm windows, cut plywood panels, sheeting, siding—even stone, metals or compositions with special blades.

You have a *bench saw combination* for the precision sawing, shaping and sanding required in building cabinets, furniture and other such home projects.

Here—in this SKIL combination that costs *less* than a one purpose tool—is proof to you that it is not necessary to put big outlays into motors, belts, pulleys, to have a *complete saw shop*. See your SKIL Home Shop Dealer and save \$20 on this wonderful SKIL portable saw, bench saw, sander and shaper combination!

SKIL Saw Table Quickly converts your SKIL Saw to tilting arbor table saw. Makes all cuts—bevels, miters, cross cuts, rips. Actually doubles use of saw.

SKIL Sander and Shaper Kit. Quickly converts SKIL Home Shop Saw Table into shaper and drum sander for all drum sanding, grooving, moulding, shaping.

\$20 Gift Certificate applies on this complete SKIL Sawing, Shaping, Sanding Combination.



③ Converts to Drum Sander



④ Use as a Shaper

Act Now! You must buy your SKIL Home Saw by December 31, 1953. See your dealer displaying SKIL Home Shop Tools. Sold by leading Hardware, Appliance and Department stores.

SKIL
HOME SHOP TOOLS

Made only by SKIL Corporation,
Chicago 30, Illinois,
formerly SKILSAW, Inc.
In Canada: SKILTOOLS, Ltd., Toronto 9.
Factory Branches in All Leading Cities

looking for corners to cut, then the small English car is well worth your interest.

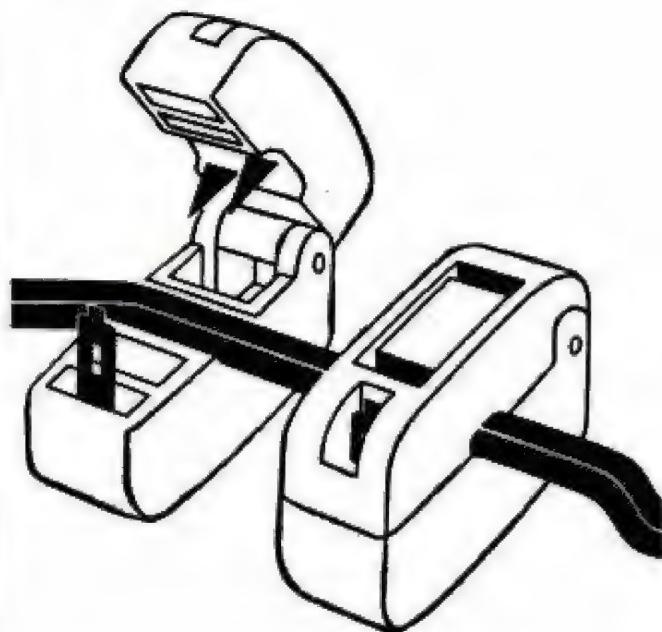
There are two special groups for whom such a car ought to have special appeal. For the city family, the Minx would make an ideal second car, especially for the woman driver. But the difference in the gear-shifting pattern may be discouraging and perhaps American women, like many of their husbands, prefer their cars big, bright and powerful.

We discovered another group, much smaller than the first, for which the English car has appeal. That is for the family that plans to tour Britain or the Continent. One sees American cars in Britain but they look rather out of place. The British car is geared to the British road. And there is a financial advantage in buying a car for touring. We estimated that the use of the Minx for two months in Britain saved us an outlay of at least \$300 in other modes of transportation, besides giving incalculable pleasure to ourselves and friends. We figured that the net cost of the car (after deducting the \$300) delivered to us in New York was about \$1300—a pleasing figure.

Should you ask us about trade-in values and resale markets, we would reply that so long as the Minx maintains its present level of performance we have no interest in either one.

★ ★ ★

Plastic Clamp-On Outlet Taps Electric Cord



You can tap a standard electrical cord at any point with an outlet that is clamped to the wire. Two metal points pierce the insulation and establish contact. As the insulation is not removed, no shocks or short circuits are possible. Made of plastic, the small device fits number 18 wire.

It's easy to make these REPAIRS

You can make loose metal, wood, or plastic parts tight; anchor bolts in concrete to stay; seal cracks in metal; tighten loose screws and fixtures in wood, metal or tile—with Smooth-On No. 1, the iron cement of many uses. Just mix, and fix. Smooth-On No. 1 hardens quickly like iron, and expands as it sets. Forced into any opening, its unique expanding action makes the repair. Keep a can on hand, it will not deteriorate. Smooth-On No. 1 is at your hardware store.

FREE Repair Handbook

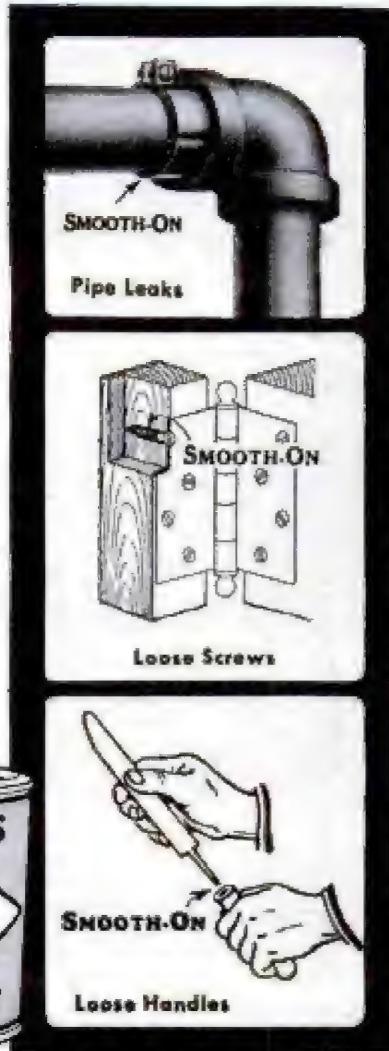
40 pages, many illustrations, easy directions for ingenious time and money saving repairs you can make yourself. Write for your free copy.



SMOOTH-ON MFG. CO., Dept. 37K
570 Communipaw Ave., Jersey City 4, N.J., U.S.A.

SMOOTH-ON

THE IRON CEMENT OF MANY USES



**TRY MY "GIFT FORMULA" FOR
GETTING YOUR COMPLETE WORKSHOP**

*Build your one-motor
DELTA'SHOP this ideal way—
A TOOL AT A TIME!*



*FIRST I BOUGHT THE
BASIC SAW AND STAND*

...and that gave me the tool to do the sawing operations that are needed on every job. The DELTASHOP'S big tilting blade saw does many other important operations, too—such as cutting grooves, decorative moldings, etc.—and its accuracy helps me do work like a professional.

Saw and stand, less motor \$109⁵⁰

*LATER, MY WIFE GAVE ME
THE COMPANION JOINTER-PLANER*



To do any finished-looking job you must plane the edge of a board right after you rip it. The Delta jointer planes boards up to 4" wide . . . does operations such as tapering and rabbeting, too.

Jointer, complete \$49¹⁵



*THE DRILL PRESS WAS A
GIFT FROM MY FOLKS*

In addition to doing accurate drilling, the Delta drill press made it possible to make mortises, do routing, carving, sanding, polishing, make beautiful shaped edges . . . actually it's a "master of all trades."

Drill Press.. \$57⁵⁰

*MY KIDS JOINED FORCES TO
GIVE ME THE SANDER*



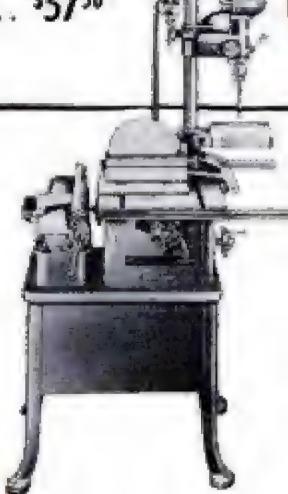
This handy, low cost tool is perfect for finish-sanding jobs —has many other uses, too.

Sander.. \$17⁵⁵

Ask about the DELTASHOP "tool-at-a-time" plan today—at your Delta dealer, department store or IRHA hardware store. Then start planning your Christmas for this perfect gift. *Delta Power Tool Division, Rockwell Manufacturing Company, 502K N. Lexington Avenue, Pittsburgh 8, Pennsylvania.*



DELTA QUALITY
MAKES THE DIFFERENCE



Prices slightly higher west of the Rockies

DELTA **QUALITY POWER TOOLS**

Another Product by

Rockwell



Here's how for Home Painters

Ceilings are no longer difficult to paint. A paint roller eliminates dripping down the arm, gets the job done 2 to 4 times as fast. Here are some handy time-saving tips.

Loosen the base plate of light fixtures. Drape with cloth to prevent splattering. Cover floor and rug with paper.



Put furniture in little groups. Cover each group with drop cloths. (Eliminates trouble of removing furniture from room.)



Tape roller tray with newspaper. (Makes cleaning pan a cinch.) Fill half way with Devopake, a one-coat soft-sheen paint.



Paint edge of ceiling first with 2-inch Superkleen brush. Use 18-inch piece of cardboard to keep from getting paint on wall.



Do the rest of ceiling with roller. Work away from light. Easier to see lap marks. For best results, use a Superkleen roller.



Dip roller into edge of paint. Roll back and forth until evenly coated. If roller drips when you use it, you are overfilling it.



If you are painting the outside of your house, use Devoe Wonder-1-Coat House Paint... gives 2-coat beauty and protection in just one coat, cuts repainting time and costs practically in half. Your Devoe dealer (in Classified Phone Book) will help you with all your painting needs.



When You Plan That House

(Continued from page 152)

should be two living spaces in the house—one a "quiet" living room for relaxation, for reading and for the reception of guests. On the other hand, there is a definite need for a "noisy" living room which may be labeled game or rumpus room. The noisy room seems especially useful for a family with young children and teen-agers. In planning your living room make certain that it will not become a hallway.

Dining Room. As economic pressure made it necessary to reduce the size of the house, the dining room was often eliminated and the combined living-dining room resulted; however, experience has shown that a dining space located in the living room should not be the only dining space in the house. Studies of family housing likes indicate that families want some form of dining space in the kitchen.

Multipurpose Room. The all-purpose room may serve for playroom, dining room, spare bedroom or den. The room is sometimes located adjacent to the living room where it may be opened to give a larger living room or closed to form a bedroom. The space is most valuable if it is located adjacent to the kitchen so that it can be used for child play or dining.

Kitchen. Basically the kitchen is for food preparation. Of course, many other activities may be carried on in this area—eating, laundry, ironing, child play and, in some instances, the heating unit is located here. The final design of your kitchen will depend upon the activities which you wish to accommodate there. The idea that the kitchen is a part of the house that must be hidden is disappearing. Open kitchens are being used more and more. This ties in with our informal way of living. Many new homes are being designed with extraordinarily large kitchens. Only a portion of the kitchen is the actual cooking space. The other area serves for dining, lounging and general activities in this "living kitchen."

Bedrooms. For sleeping and dressing, the bedroom may be small; but the bedroom many times becomes the child's "own room" and should be large enough to function as a secondary living room or playroom. Incidentally, your house will have much greater resale value if you have at least three bedrooms.

Bathroom. The standard bathroom is being replanned to give better accommodations. One suggestion is the divided bath in which there is a lavatory and water closet in one section and a lavatory and bathtub in a second section.

(Continued to page 266)



Don't put in a drop of anti-freeze...

UNTIL YOU'VE CLEANED OUT RUST WITH

DU PONT Cooling System CLEANSER



HOW RUST AND ACID CORROSION WASTE ANTI-FREEZE... CAUSE TROUBLE AND EXPENSE



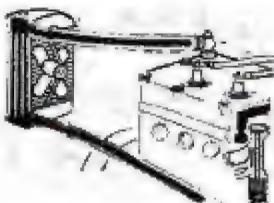
Accumulated rust, scale and corrosion plug radiator passages. This slows down circulation, may cause leaks. Anti-freeze may leak out . . . or "boil out" as motor overheats.



Acid corrosion and rust take place in engine block, too. Circulation slows down, proper cooling becomes impossible. Motor overheats and causes "boiling out" or creeping of anti-freeze.



Water-pump impeller blade is often attacked and eaten away by rust and corrosion. This causes failure of circulation in cooling system and dangerous overheating.



The heater is also part of your car's cooling system. Rust, scale and acid corrosion can impair its operation by clogging passages or destroying vital parts such as tubes.



BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

Before you put in anti-freeze, your car's cooling system needs a careful check-up.

Clean out rust and scale—safely, easily, thoroughly—with Du Pont Cooling System Cleanser.

Simply pour Du Pont cleanser in the radiator and run the motor. It works even while you're driving . . . dissolves rust so it can be drained out. No reverse flushing necessary. Neutralizer is included in each can to complete the job. Insist on the original and genuine Du Pont Cleanser, marketed only by Du Pont in a package bearing the red Du Pont oval trade mark.

Ask about the complete Du Pont pre-anti-freeze service at your service station today and assure trouble-free driving this winter. Or get a can of Du Pont Cooling System Cleanser at your auto supply store . . . \$1.25 at most dealers.

Insure against leaks that waste anti-freeze
with **DU PONT Cooling System SEALER**

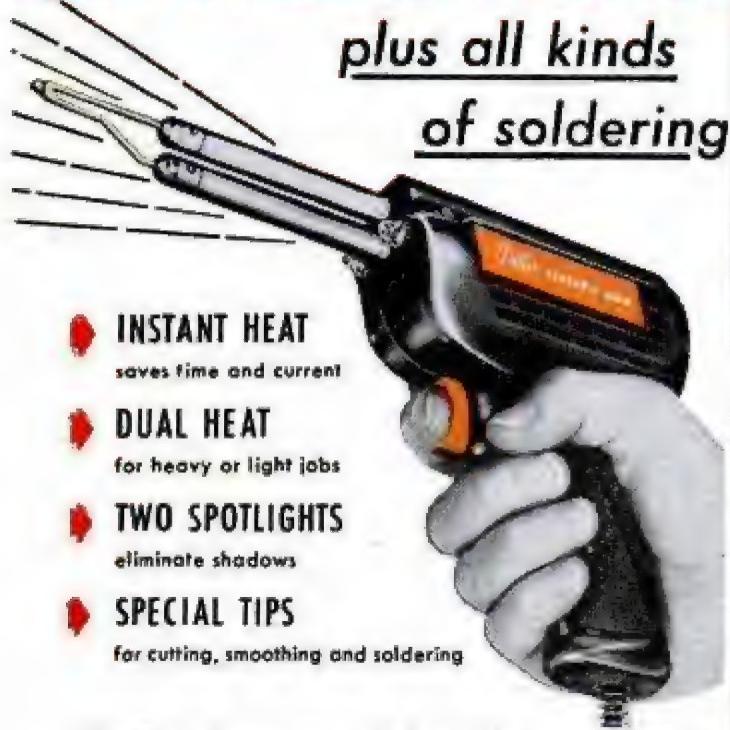
Even though your cooling system seems watertight, many permanent anti-freezes will "creep" through tiny pinholes. You can stop this seepage immediately with Du Pont Cooling System Sealer. Simply pour it into your radiator. It can't clog or harm hose or metal parts.

Don't forget fuel line anti-freeze—Du Pont Gas Guard.



FOR DOZENS OF HOBBY AND HOMECRAFT JOBS

plus all kinds
of soldering



- **INSTANT HEAT**
saves time and current
- **DUAL HEAT**
for heavy or light jobs
- **TWO SPOTLIGHTS**
eliminate shadows
- **SPECIAL TIPS**
for cutting, smoothing and soldering

Here's the fastest, most efficient soldering tool ever, and by simple interchange of tips it does dozens of other money-saving jobs. Thousands are in use by Radio and TV technicians and professional mechanics. 4 models up to 275 watts. See them at your Hardware Dealer, or write for catalog describing uses.



Cuts plastic tile



Seals freezer packages



Removes hard putty



Repairs furniture scratches

Weller

ELECTRIC GUNS

816 Packer Street, Easton, Pa.

Available at Better Hardware Stores Everywhere

You'll Never Need to Use a Dull Kitchen Knife Again!

Stainless Steel, Regular,
or Hollow-ground



Aladdin Carbide KNIFE SHARPENER

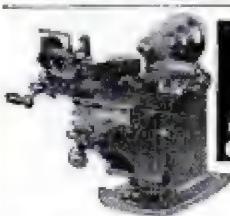
... puts a sharp edge on dull knives with 3 or 4 light-pressure strokes between Aladdin's diamond-cut Carbide "Jewels". Thereafter, a single touchup keeps it sharp.

Jewels are mounted in sturdy plastic, choice of red or yellow. Attaches easily to steel, wood or tile.

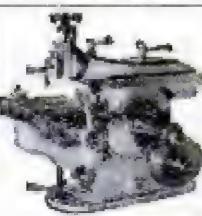
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Catalog with complete construction drawings of this bench milling machine or six inch shaper 25 cents per set postpaid or send one dollar for drawings of shaper, three millers and three lathes. Refund on castings order.

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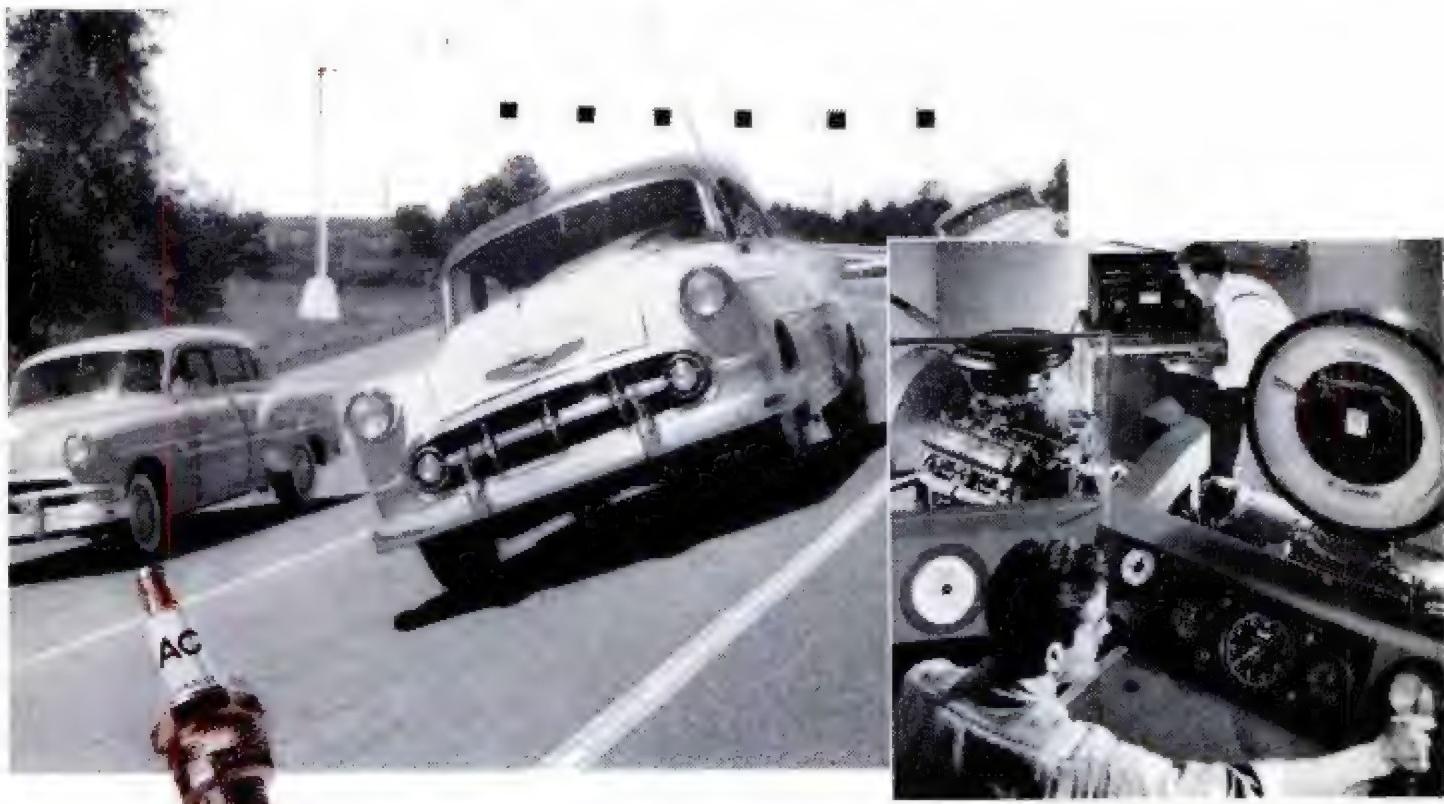
Screwdriver Kit (3" high) shown contains five tiny blades sizes .100", .80", .70", .55", .40" and chuck type handle.

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Utility Room. The name "utility room" means many different things to many persons. This room may include space for the furnace, the water heater, washer, drier, ironer, plus space for bulk storage. An important consideration is the increasing desire for main-floor laundry space.

Storage. Storage is one of the basic problems in the house. There are different kinds and types of articles and equipment that must be stored, and you will have to tailor your storage to your own measurements. Generally speaking, however, these guides can be used: It is desirable to have a minimum of four feet of clothes-hanging space for each person in the bedroom; it is also desirable to have a closet this size near the front entrance. There should also be storage for cleaning equipment, linens and, of course, for food, dishes and other items in the kitchen.

Besides these basic storage units, one should consider special units for hobbies, sewing, sports, books and records. Be sure to include enough space for garden equipment, storm doors and windows, screens, etc. This bulk storage may be handled nicely in the garage or basement, or an outside storage unit may be provided.

Hallways, Entrances. Locate the front entrance so that it leads to a central area of the house. Consider its proper relationship

to the street and driveway. Whenever possible, the front entrance should lead into a hallway rather than the living room. If this cannot be done, arrange the entrance so that only a small portion of the living room functions as a hall. Halls should be planned so that the bathroom may be reached without crossing any living space. Locate the service entrance near the garage and driveway if possible.

Arrangement of the Rooms. Having determined the rooms you want in your house, you are ready to consider some of the factors which will influence their final assembly.

It is usually desirable to group the rooms into a quiet zone and a noisy zone. Bed-rooms and studies belong in the quiet zone; kitchen, dining, playroom, etc., belong in the noisy zone. The living room may be located in either or both groups. In many cases it may serve as a buffer between the two groups, but its location depends upon how you expect to use it.

Today there is a greater emphasis on planning for privacy. Major rooms are often oriented away from the street; service rooms and rooms of lesser importance face the street. The "turned around" house presents, in many cases, an almost blank wall to the street. In these houses, the

(Continued to page 268)

*A woodworker's dream
come true...*

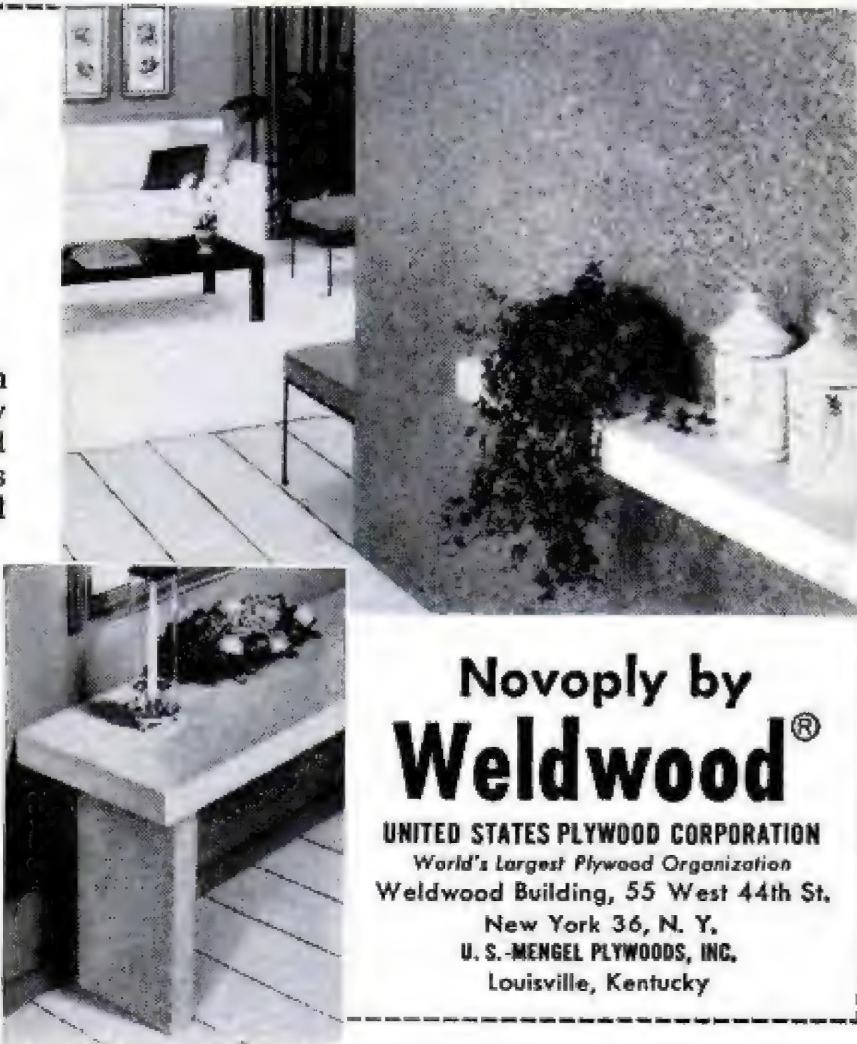
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The beautiful redwood Novoply® wall on the right, all 64 sq. ft. of it, cost only about \$23.00 for material. It's all wood—with a rich "textured" look... yet it's smooth and flat because of the special bonding process. Install it yourself with ease. For finishing—wax, polish or stain. No upkeep. Ideal for remodeling or for new homes. *And—real wood at low cost!*

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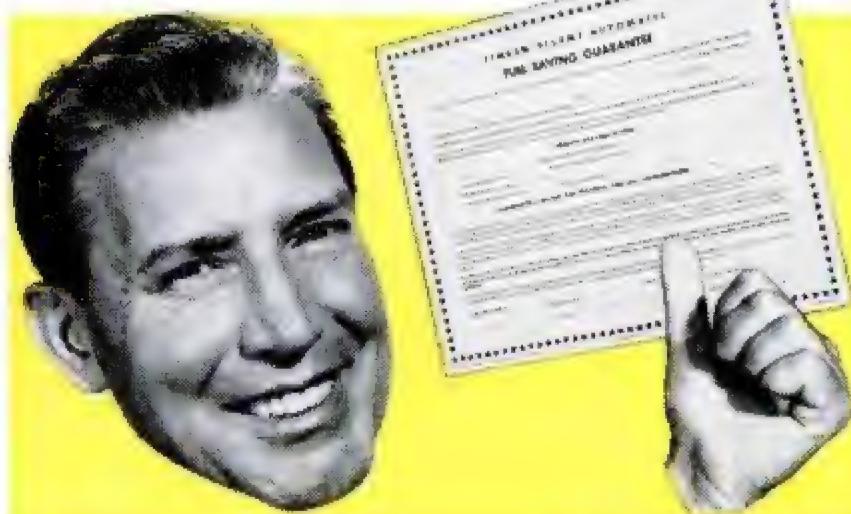


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emphasis is in the back yard with outdoor living space and garden screened by walls, fences and hedges.

The open plan involves the use of rooms which are separated from each other by half partitions, storage units, or merely by a furniture group. This type of planning allows the eye to see a greater distance and, thereby, gives a greater feeling of space. It is especially useful in the small house.

The flexible plan allows you to readjust your house at will to meet varying conditions. In the ultimate flexible plan only the kitchen and the bathroom will have fixed partitions, while the other rooms are formed by movable storage and wall units. It may be some time before this method is available to everyone, but it has wonderful possibilities in making a house more adaptable to our changing pattern of living.

There are several special arrangements that you may consider in assembling the rooms in your house. One is the solar house, in which all major rooms are arranged in an east-west row with large glass on the south side. The rooms are usually connected by a hallway running along the north side of the house. Solar orientation, with proper overhangs, will prevent the entrance of the sun during the hot summer months, while allowing its benefit during the winter.

Exterior. The exterior grows out of your previous decisions. Your basic choice of the site, the type of house, plus what might be called fashion, dictate the appearance. In the realm of fashion, consider some of the characteristics of the contemporary home. It has the long, low look. The roof types are usually low, either low gables or hip roofs or flat or shed roofs. There are large glass areas which allow the sun to enter, which frame a beautiful view, or serve to give visual extension of the space in the house and tie the inside and the outdoors more closely together. Another characteristic of today's house is the emphasis on natural finishes; another is use of the many new and interesting materials, as well as use of old standby materials that have appeared with new finishes and new designs. Your selection of the plan and of the basic type will enable your architect to design this house to suit your tastes.

Construction. Part of your planning problem is to consider the type of construction you will use—for the floor, for the walls, for the roof.

Concrete floor slabs are becoming more and more popular for the basementless house. Slab construction helps with the long, low look; also, it is usually slightly cheaper, especially where many houses of

(Continued to page 270)

GET A SMOOTHER, QUIETER ENGINE... MORE PUNCH ON THE PICK-UP...with the **MARVEL INVERSE OILER**



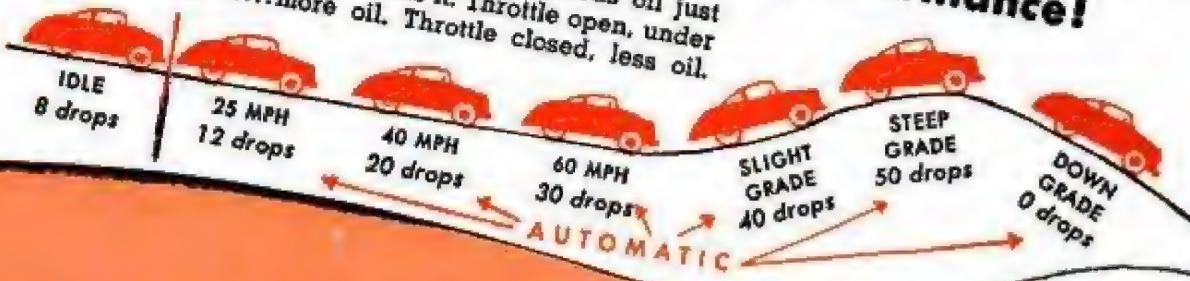
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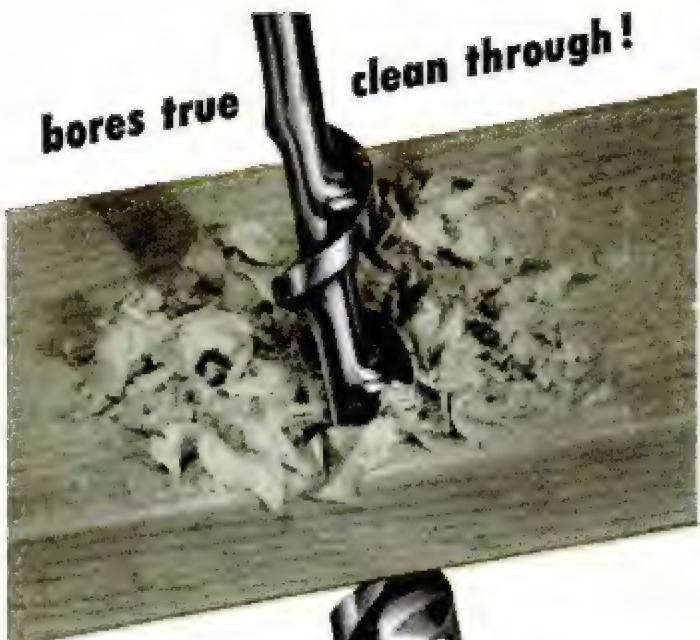
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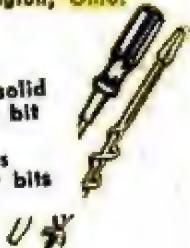


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the same type are being built at one site. Concrete floor slabs have some limitations. Certain types of flooring cannot be used over slabs; be sure to check with your architect or your flooring supplier on this point. In colder climates concrete floor slabs must be insulated at the edge to prevent excessive heat loss and the resulting discomfort.

When standard wood-floor construction is used for basementless houses, certain improvements in construction are now considered necessary. A layer of heavy roll-roofing paper over the ground under the floor will prevent moisture rise and, thereby, eliminate a major source of undesirable moisture in the house. In colder climates insulation is desirable, either around the foundation walls or immediately under the floor.

Don't be surprised if your builder uses some unfamiliar construction techniques. Basically, frame walls are much the same as they have been, but the method of erection is different. To speed up construction, builders now often construct the wall flat on the floor of the house and then tip it up in place. The more work done in the horizontal position, the greater the saving.

For roofs, many builders are now using truss construction to span the entire roof from outside wall to outside wall. [Editor's note: See page 156.] This eliminates the need for interior load-bearing walls and allows the placement of partitions wherever desired without consideration of roof support. Truss construction is also useful in that it allows the house to be enclosed quickly so that construction may go on inside in spite of inclement weather.

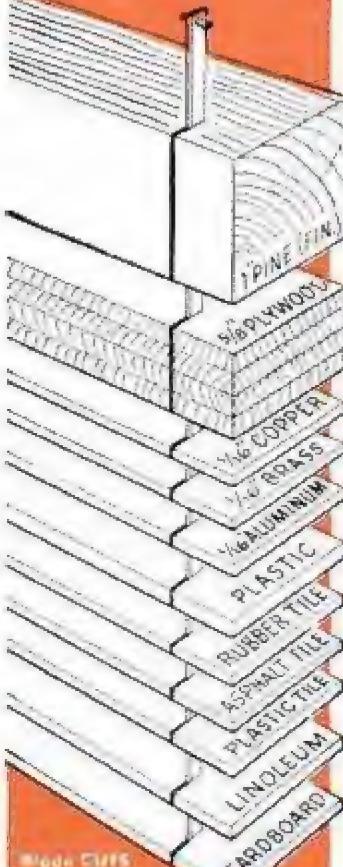
Prefabrication. The prefabrication of houses is becoming more and more important every year. Many different prefabricated houses of varying sizes and accommodations are on the market. Certain prefabricated parts are readily available. Preassembled closet units, windows and ready-hung doors, are three examples.

Heating. The general trend of present-day heating for homes shows that most heating systems are being designed to deliver the heat at the outside perimeter of the room where most of the heat is lost. This is effective in overcoming high heat losses through large glass areas. Warm-air perimeter systems and hot-water baseboard systems are designed on this basis; these systems are very good for heating concrete-slab floors. An alternate may be panel (radiant) heating with pipe coils or air channels in floor or ceiling, but these systems must be selected cautiously. In general, a panel system does not respond

(Continued to page 272)

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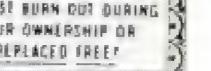
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PINS



BIRD
HOUSES



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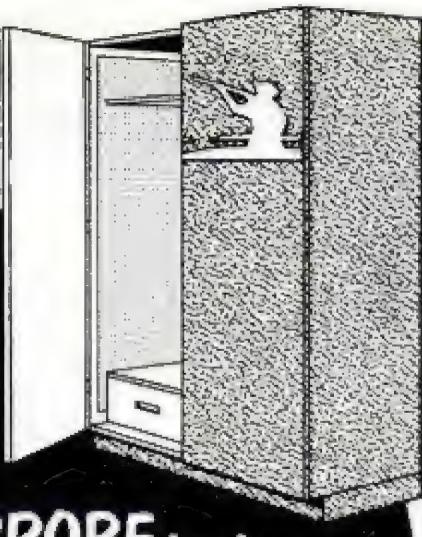
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rapidly to changes in outdoor temperature and this may result in long warm-up and cool-down periods.

Forced warm-air heating systems are adaptable to summer cooling; hot-water systems can also be adapted to summer cooling, but the problem is much more difficult. Panel systems are not generally adaptable to residential summer cooling.

Remodeling. Perhaps you have the choice of remodeling your present home or designing a new one. This is, of course, a difficult choice to make. At present building costs, it is often difficult to get as much space in your new home as you now have; however, if the space in the old house is not conveniently arranged and is not suitable for your purposes, it may be advisable to build a new home or rearrange the old one. If you decide to remodel, be sure to check the basic structure of your house and see that it is firm and will have a long life. Check to see that the structure will allow you to adjust your plan so that it will meet your needs. Will you need a new heating system? Will you need more storage? Check what costs will be involved. Your own opinion determines whether you will remodel or build a new house. ★ ★ ★

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ALUMILADDERS

Let's Look at the Prefabs

(Continued from page 173)

to three units, which produce a complete five-room house. The mobiles are a happy medium between the shortcomings of trailer houses and the troubles of buying and selling houses for anyone who must move often. They can be disassembled and hauled to new sites via truck or rail.

As a general rule, panel and sectional prefabs are sold through local dealers. The dealer builds for you, assembling the house package shipped by the factory. He also takes care of the foundation, masonry, wiring, heating, plumbing and other on-the-site work. He will help you buy the lot, get the necessary building permits and obtain financing. One panel-prefab manufacturer, National Homes Corporation, is known to finance or handle the mortgages on its houses itself. A few prefab manufacturers build only to sell to realtors.

The precast house manufacturers sell direct to the consumer; at least one of the panel manufacturers, the Pease Woodwork Company, Cincinnati, Ohio, sells its partially finished panel houses direct. Another adaption of the prefab is built by Nelson Way Homes of Santa Barbara, Calif. Under this plan, the outside shell of the house is completed from panels or sections built at the factory. All other materials needed to complete the house are delivered to the site, together with detailed instructions (and expert help if necessary).

Some unique prefabs, too, have been developed—one a panel-type cabin shipped to the United States from Sweden. You can put it together yourself in about 60 hours. Designed for use as a summer cottage or guest house, the cabin has wall panels that are fastened together by three built-in ratchet locks, which are tightened with a special wrench. A steel house has been developed in Los Angeles that can be erected in two days. It is made of two sheets of steel separated by 6 inches of rockwool insulation; the prefab panels are joined together at the site by a slotted device, then the joint is spot-welded. An unusual design is the "accordion" house of Acorn Homes, East Acton, Mass. The house is built around a main core, with the walls, floors and ceilings folded up against the core for shipment. At the site, the walls are pulled out and bolted into place on a special foundation of steel beams and concrete posts.

The prefab manufacturers are most alert in using new developments and new construction methods. Their houses today are sound, and you may well find your new home pictured in the pages of a prefab manufacturer's catalog. ★ ★ ★

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TABLE AND
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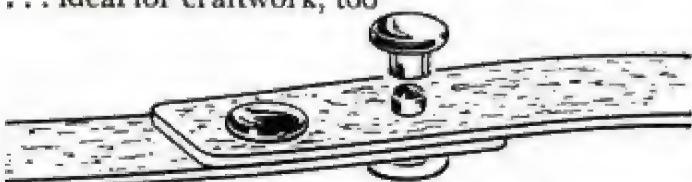
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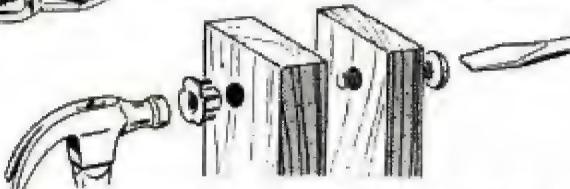
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Mr. House Expert, We Have a Question

(Continued from page 166)

architectural design, uniqueness, location; all those things have value to some people. The same amount of money—let's take \$15,000 as an example—will buy a certain amount of space; on a custom-built basis you would have uniqueness of design, the individuality they prize and are willing to pay for. That becomes valuable to them, location and size of the lot, and so on. The same couple might say: "We will sacrifice architectural design and location because value, to us, represents space." Value is the thing you must talk about.

Q: If a buyer can fit his needs into a mass-produced house, is that where he could get the best buy?

YOST: There is no absolute yes or no; but I think it stands to reason that a house produced in quantity is going to be a better value than one which is individually built and individually designed. We all know that the pilot house we build for a group development costs more than the house will cost after it is in production. The pilot house is just the same as the custom-built house, in many ways, as to cost. When they build them in quantity, builders pre-cut or use other methods of money-saving mass production.

HAEGER: I think a house should fit the needs of a family, rather than vice versa.

YOST: That is right.

BARTLING: It is true, though, today, that all the successful builders are producing mass-produced houses which fit the needs of 85 or 90 percent of the buying public in certain price categories. You have a three-bedroom house, a four-bedroom house, a two-bedroom house; and the average family's living requirements are outlined in that package as to room size, circulation, location of kitchen fixtures.

SMITH: I think you can capsule a lot of this in a little phrase we use in our shop: "We want our customers to own their homes; we do not want the homes to own the customers."

Q: What has been your experience with partly finished or shell houses?

BARTLING: It is a question of financing.

YOST: It is just a question of a man's being able to put his own labor in.

BARTLING: It tends to build a neighborhood of shacks. One man works like mad; the other says: "I will work next week." So they hang blankets up for partitions and, two years later, they are still living in a shell house.

YOST: But, if a man wants to finish off

(Continued to page 278)

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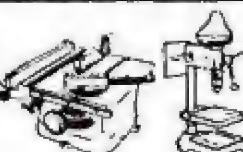


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his attic in an otherwise completed house, or add a room or a garage, that is fine.

Q: What type of house is the best long-time investment? Is it the one-story peak-roof ranch, flat top modern, or traditional?

SMITH: There, again, you have no one answer. We come back to what the man and his wife consider value. I think any well-designed, well-constructed house in any of the categories, designwise, which you have mentioned, properly located and purchased at the right price, will always be of good value if maintained. I think the traditional forms will always be with us.

YOST: I do not think Mr. Smith means a so-called Georgian house. I think that is dying, and dying fast. A house which is built in the actual Georgian style, or Georgian prototype, is going to be a very old house 10 years from now.

That is going to vary with the area in which it is built, too; but our modern methods of living (the automobile, the home laundry, the large glass areas, air-conditioning, the sun shields, overhangs of roofs, playrooms, all those things) just do not lend themselves to what is actually a Georgian or a Cotswold cottage, or whatever. So the traditional house, as such, is not going to continue any longer than lending institutions and others of ultraconservative minds force it to.

Q: What about a good, traditional exterior with an interior that has been adapted to modern design?

YOST: We are always going to have modification, but it's usually a botched job.

SMITH: I think we all agree that the modern, or contemporary, form, the simpler form, by its very nature, offers more house for the dollar. Out in our area (California) we have been able to prove very conclusively that we can offer space and comfort in our contemporary house, 23 percent more than the same space enclosed in the ranch house. We can prove it with facts and figures. Ten or fifteen years from now the contemporary house will have a greater resale value.

YOST: The modern house does not have to be extreme. We can have a conservative modern house which still has a lot of tradition: Traditional materials, traditional concepts of family life, all that sort of thing which makes a homey house. It need not be angular, it need not be severe, it need not be cold. It should not be.

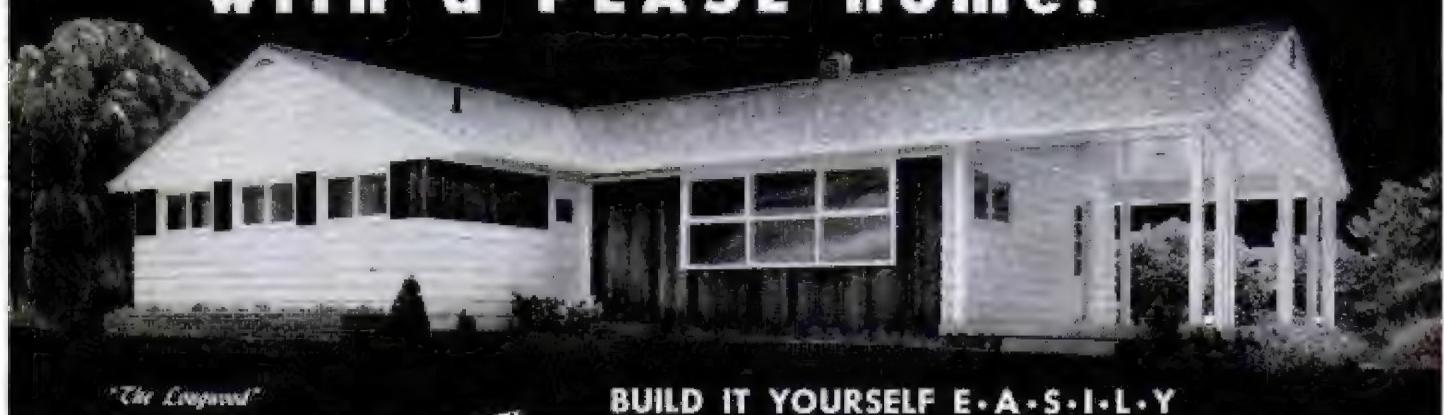
BARTLING: In fact, that house is as dead as the colonial or Georgian house.

YOST: Or the stylized type—that is, the "moderne" with an "e" on the end of it.

BARTLING: Angular corners, glass blocks.

(Continued to page 280)

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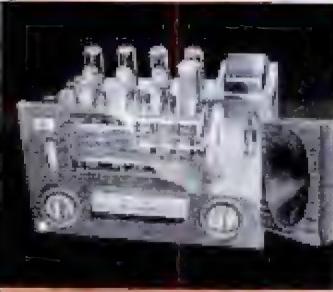


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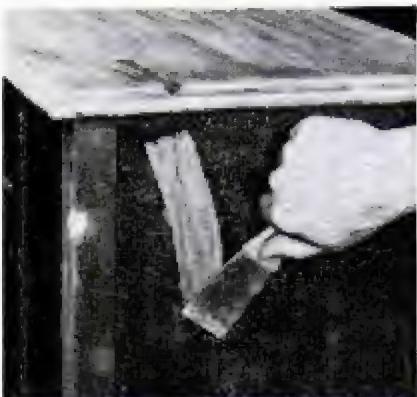
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SMITH: We always have the publicity seekers who do these things. But I think the trend definitely is in the direction of what Morgan Yost is talking about.

YOST: We should think of modern not as a style, but a way of thinking and living. We want to think what this house is going to do for the family. In my custom house, I never show the people what the outside of the house is going to be like until I have shown them the plan and gotten them to approve. When I show them the perspective of the house, they say: "Of course, it has to be that way." It is just a natural out-growth of the plan and their way of life.

SMITH: Planned from within, meeting their requirements of space and living.

YOST: That is what a true using of a traditional house cannot do. The traditional plan means symmetry, of a sort at least; it means a certain type of window, a certain kind of entrance. That is not planning from within; it is crowding into a shell. At any rate, the exterior should come last in a well-planned contemporary house.

BARTLING: There is an architectural expression that "form follows function." You work it out and it just falls into place.

Q: Would you advise a two-bedroom or a three-bedroom house?

SMITH: You have to relate it to a family's income and ability to purchase. Out in our area (California) we are dealing with the working man with modest income; down-payment variation is rather slight. A man pays 5 percent down, using the FHA title. We find that between 25 and 30 percent of our buyers buy a two-bedroom house.

BARTLING: Isn't it true that most builders have found the demand for the three-bedroom house, even for the family without a child, exceeds the demand for the two-bedroom.

SMITH: No denying the desire.

BARTLING: In our area (Tennessee) the builders around Knoxville, regardless of price range and without exception, are building three-bedroom houses.

YOST: I think it would be a good idea for any young couple to stretch themselves to get a three-bedroom house.

Q: Would you advise building a basement or not?

SMITH: You must consider, first of all, which part of the country we are speaking of. In some parts we have freezing conditions where the design of a structure calls for having concrete go down into the ground to get beyond the frost line; having had to go that far, it becomes fairly sense-making to go a little farther and create a basement. Out in California, I do not think

(Continued to page 282)

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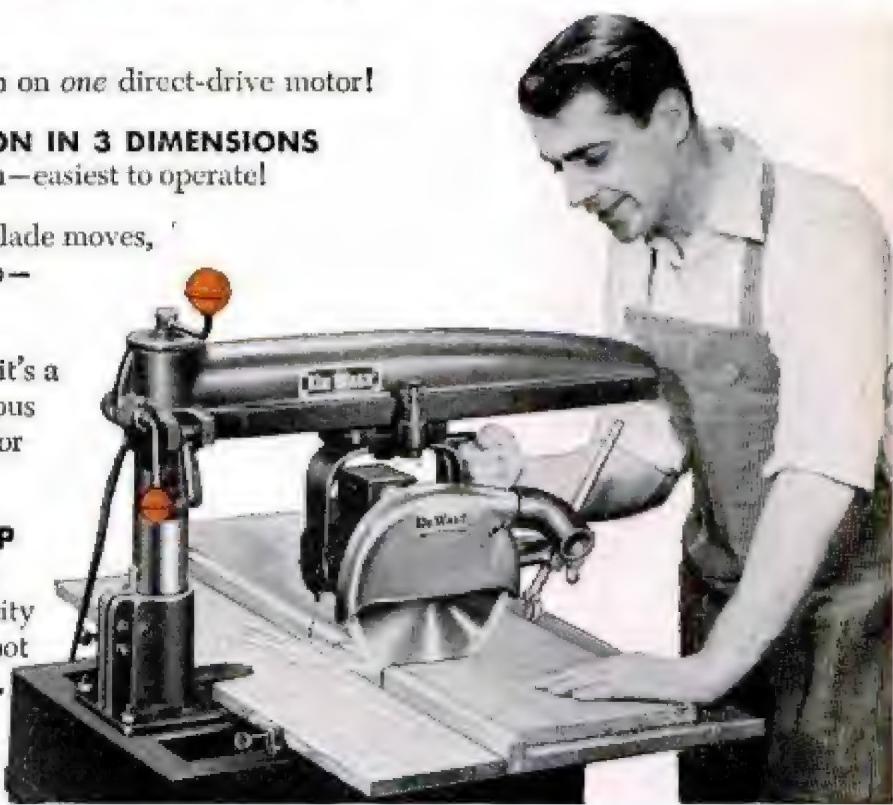
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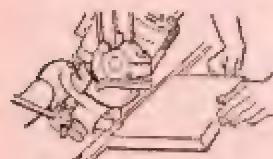
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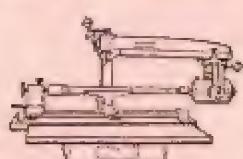
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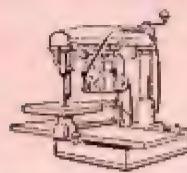
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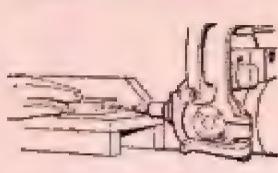
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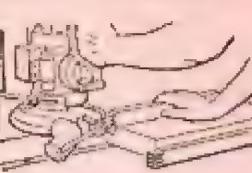
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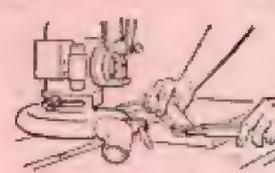
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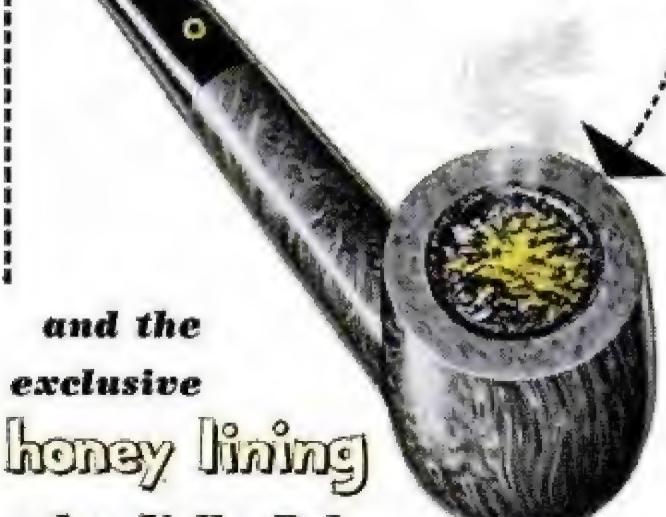
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YOST: The split-level house has become very popular just for that reason. It allows you to use the full depth of your footings for the actual wall of the house.

BARTLING: The biggest fault of the house without a basement (that is all I build) is that in most cases we do not have the equivalent of the space we have displaced. We will stick on a four-by-four storeroom and say that will take care of everything. Actually, the storage space does not have to be as big as a conventional basement, but you do have to think of the lawn mower, the bicycle, the garden tools, the workshop.

YOST: The lack of storage space is one of the most common faults of houses, either custom-built or tract-development.

HAEGER: Anyone building or buying should think carefully about his storage requirements—then double whatever he has figured out.

BARTLING: This is a good time to bring up the advent of the so-called storage wall or working wall.

YOST: A bedroom, for instance, with built-in storage wall or built-in cabinets or drawer cases can be much smaller than one into which mammoth store-bought things have to be moved. It also means the buyer gets the built-ins with his down payment as part of the house.

Q: What advice can you give on new materials?

HAEGER: New materials which are acceptable will get into the houses simply because some architect, engineer or builder has analyzed them and become aware of their potentials. Price is important, too.

BARTLING: It is simply a question of economics. If a new material is reasonable in price and good stuff, it will be used. There is no so-called miracle material which I know of on the market today—steel, plastic, aluminum or what have you—which will do all things for all people.

Q: What are the most significant new features in postwar houses?

SMITH: Better planning, period! You can break that down.

(Continued to page 284)

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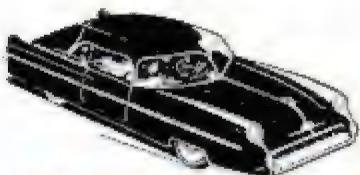
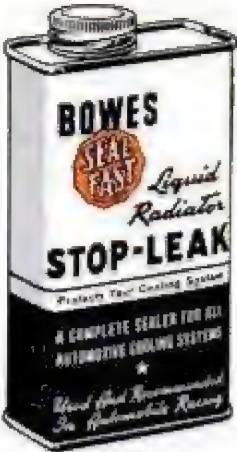


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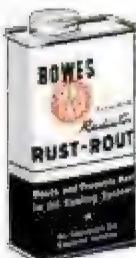
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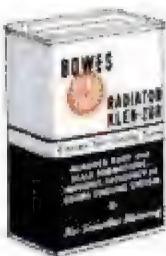
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YOST: Open planning, flexible planning, multiuse of the same space, ease of circulation (so the family can get from one place to the other without going through certain rooms or without walking long distances); attention to children, for example enabling them to come into the house and go to the bathroom without tracking through living rooms; better kitchen planning, so that meals can be gotten without kids traipsing back and forth, and the kitchen is closer to the eating area. Also, houses are being planned remembering that we enter and leave our houses by automobile. The garage or carport has become an important part of the house. Modern houses are just turned around from what used to be so that the outdoor space, such as a rear garden, can be used as an extension of the actual living space; even in the wintertime, it is visually a part of the inside.

BARTLING: I think we should mention the more extensive use of glass to increase the apparent size of a small room.

SMITH: Glass walls and big windows should be used with care, taking into consideration orientation in relation to sun and shelter.

YOST: Let's castigate specifically the picture window on the front, in which we always see the ruffled lamp shade—absolutely useless. A house should be closed off from the street and the big windows put in the rear where they belong.

BARTLING: There is another school of thought on that. There was a survey at South Bend, Ind., which incorporated what everybody thought was a good idea, putting the living room to the rear. The man who tried it found that about 80 percent of the people wanted the big window on the street.

HAEGER: To me, the greatest thing which has happened since the war is the recognition of changing family living habits. One of these is indoor-outdoor living. Before the war, the notion of outdoor-living spaces was really gaining headway. But, since the war, the designers have made use of the device, and have actually done everything possible to bring the outdoor-indoor living together.

Q: Would you advise a builder to consider seriously air conditioning a house?

BARTLING: I certainly would.

SMITH: I hate to see these blanket recommendations.

BARTLING: If they can afford it.

SMITH: That is right. It is an added amenity.

YOST: I think it may be well to say that, in some climates there are so few days when air conditioning is actually needed,

(Continued to page 286)

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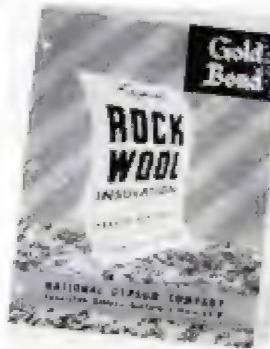
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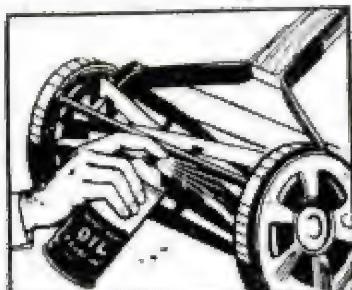


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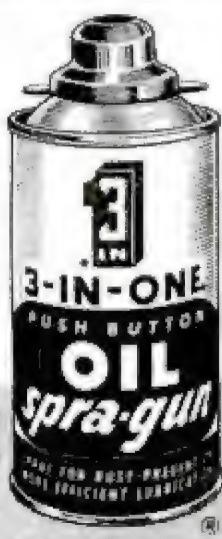


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New 3-IN-ONE spra-gun

that it is not economically sound for the lower-income family.

BARTLING: It is in Texas.

YOST: That is another thing. But I think it is sound for a man to have an attic fan.

HAEGER: We have not said anything about neighborhoods. I have some real advice for any young couple. People very often look for the house itself, without ever considering the neighborhood, the community they are moving into. The house can be perfectly planned, economically within reach, and all of that; but, if they are in an environment unlike one they should be in and want to be in, they are really an unhappy family.

A homeowner must consider all the obvious things: transportation, schools, churches, shopping centers. If I went out searching for a new house, I would decide first which community I wanted to live in. You might say the solution is the right house in the right place for the right price.

Q: Can a buyer or builder of a new home make some sort of check list to be reasonably sure he is getting a sound house? What fundamentals would you stress?

HAEGER: If you are talking about construction, I would discourage any sort of check list. I would rather see the family make a check list which went to all these things of environment, family needs, and all that sort of thing, and put their trust, constructionwise, in the hands of a good architect or a good builder.

BARTLING: Don't you think it would be safe to assume that, constructionwise, the typical house with a mortgage on it is essentially sound?

YOST: Here is one thing I think we might emphasize, that the good house is almost invariably a simple house: Simple use of materials, not changing materials just for the sake of some false idea of design, not a lot of gables, a lot of gimcracks and dove-cotes.

SMITH: It goes without saying that the simpler design is going to wear much better architecturally and retain its value much longer.

★ ★ ★

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Fired 50 miles above the earth to take pictures of the sun, a rocket-borne camera successfully photographed the sun's spectrum in the extreme ultraviolet wavelengths. University of Colorado physicists, who conducted the experiment, claim the first such photographs of the powerful ultraviolet radiation emitted by the hydrogen of the sun's atmosphere.

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DEALERS CAN INSTALL. Your car dealer or service garage can install Monroe Power-Guide in a few hours. Available now for 1952-'53 Fords and Mercurys and 1950-'53 Cadillacs. Units for other makes and models will be available soon.

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Complete Control—Monroe Power-Guide gives you the "feel of the road"—eliminates road shock and wheel fight. Takes the strain out of day-long trips.



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New Safety on soft shoulders, through gravel or sand, mud or snow. Blowouts, too, are robbed of danger when your car is equipped with Monroe Power-Guide.



More House for Less Money

(Continued from page 161)

3500) occupy 11 tracts, are the so-called ranch type—a loose term generally indicating a one-level house—and run from two bedrooms (\$8845) to a four-bedroom two bath luxury home (\$16,000). Even the smallest ones feature things like sliding glass walls, built-in range and oven, shower stalls and forced-air heat. Big ones are loaded with electrical trickery including radio-controlled garage doors, floodlighted yard, touchplate light switches, electric house numbers and garbage disposal units. To astound his customers, Cox built a model "home of the century" that does everything but go to the office and make a living for its owner. The three-bedroom, two-bath showplace has a service and laundry area, lanai room (a partially enclosed patio) fluorescent Tahitian wall mural, and a swimming pool. Time clocks turn on the outdoor floods at night; off in the morning. Touch a switch plate at the headboard of your bed, and a coffeemaker starts in the kitchen. Sliding glass walls, facing the pool in the lanai room, open and close electronically. Tape recorded music is piped to all the rooms as well as outdoor areas. Ozone lamps kill kitchen odors and an intercom system connects every room, the front door, and the pool area. Though this house is not for sale on a tract basis, many of its electrical wonders are found in Cox' mass-produced luxury homes.

Less spectacular, perhaps, but well-planned, spacious, and far more extensive is Nathan Manilow's town of Park Forest, occupying 2400 acres outside of Chicago. On curved, grass-covered malls, right now, Manilow is building 5000 single-family homes, plus 3010 "town and country" rental units. Land is ready for schools, churches, recreation and a 100-store shopping center (with theater). The builder has mapped out a 500-acre Industry Park, where light industries will be invited to move in and set up shop—just as would happen in any American town allowed to grow up normally over 100 years.

Typical lot size in Park Forest is 60 feet by 120 feet (some larger), and a wide variety of houses grace the winding lanes. Latest are the "growing homes"—two-bedroom houses with semi-finished second floors, priced at \$10,995. They are complete with automatic washer, drier and other accessories. Other two and three-bedroom varieties of brick and frame construction have sold for \$11,995 to \$16,550, featuring gas heat, metal kitchens and garbage-disposal units. Already some 20,000 people

(Continued to page 290)

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How to get more mileage out of your motoring dollar



WIPE SPARK PLUG PORCELAIN

picks up moisture; causes "shorts"; makes starting engine difficult or impossible; runs down batteries. In this case, as in so many others—preventive maintenance can save you the cost of emergency repair calls.

Guard against ignition failure during damp weather by keeping outside of spark plugs and wires clean. Dirt

live in privately owned Park Forest homes, and 12,000 live in rented apartments, where 3½ rooms bring \$75 a month; six rooms \$117.

Another Chicago variation on the mass housing theme is Joseph Merrion's 1600-unit Hometown—a neatly laid-out array of duplex homes costing \$9975 for a two-bedroom unit, or \$11,200 for three. By putting his homes in pairs, Merrion is able to set them on 40-foot frontage plots. Since the dwellings are attached, the minimum distance between units is a good 20 feet. "We find," he says, "that building duplex enables us to give people a larger and better building on less property. We can add quality items like durable, washable Sanitas wall covering in all our units and give people things like perimeter heating."

Like most carefully planned communities, Hometown is broken into curved streets, has parks, a large area reserved for community facilities and eventually will be incorporated as a self-sustaining village.

How do these fellows put out more house for less money than a private contractor? Many savings are obvious ones—bulk buying shaves prices, mass production makes for the most efficient use of labor and, when things are really rolling, timesaving stunts save plenty of money. Merrion, for instance, used to build concrete slabs for his duplexes. Chicago weather kept jamming the schedule; slabs couldn't be poured fast enough on the good days. Today, wooden floors with a crawl space foundation can be put in any time, and speed up the operation enough to save money on what would ordinarily be a more expensive job.

Many big savings in a mass development are pointed out by Dave Bohannon. "The buyer cashes in on our architectural planning," he points out. "Our full-time staff of architects, draftsmen and land-planning specialists, plus outside consultants, would cost a prohibitive figure for an individual homeowner. But prorated over hundreds of homes built from the same basic plans, the cost is relatively small per house. We're up on latest methods and materials. The buyer gets a house with more eye appeal, maximum utilization of interior space, a tested floor plan designed to meet every need of the average family. We maintain our own timberlands and mills, thus controlling quality and supply. Raw materials are shipped in bulk right to the site, thus saving freight."

Greatest saving, though, is in actual construction on new assembly line methods. Many mass builders, like Bohannon in California, Merrion in Chicago, and Tom Lively, president of the booming Center

(Continued to page 292)



DO THEY LIGHT?
... or a life!



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Construction Company, Inc., in Dallas, prefabricate things like roof trusses, walls, window frames, chimneys and plumbing assemblies. "Our trusses," says Bohannon, "are prefabbled on a jig. On the site, a roof is up and ready for sheathing in 40 minutes. Wall framing is a table operation—including bracing, fire blocking and double plating. Sections are stacked on pallets and moved right out to the subfloor in one operation. Besides saving skilled labor and virtually all waste, this gives the buyer a precision-built house."

Some of the best architects in the business are designing homes for mass builders. Cliff May and Chris Choate have designed some prize winners for the Valley Realty Company, Cupertino, Calif., which are the talk of the West Coast. They have a two-bedroom house (850 square feet) with carport for \$7850 and a modern three-bedroom two-bath home for \$10,500.

Mechanization in mass housing can soar to dizzy heights. At Lakewood, when houses were popping up hundreds at a time, workers operated in small teams, each responsible for one or two operations. Materials arrived on each site in exact amounts. Expeditors prowled the area in radio cars, unjamming bottlenecks by prompt reports to headquarters. Automatic nailing machines helped workers slap in

subfloors in one fourth the time it would take manually, and did a better job. Belt conveyors carried shingles to the roof.

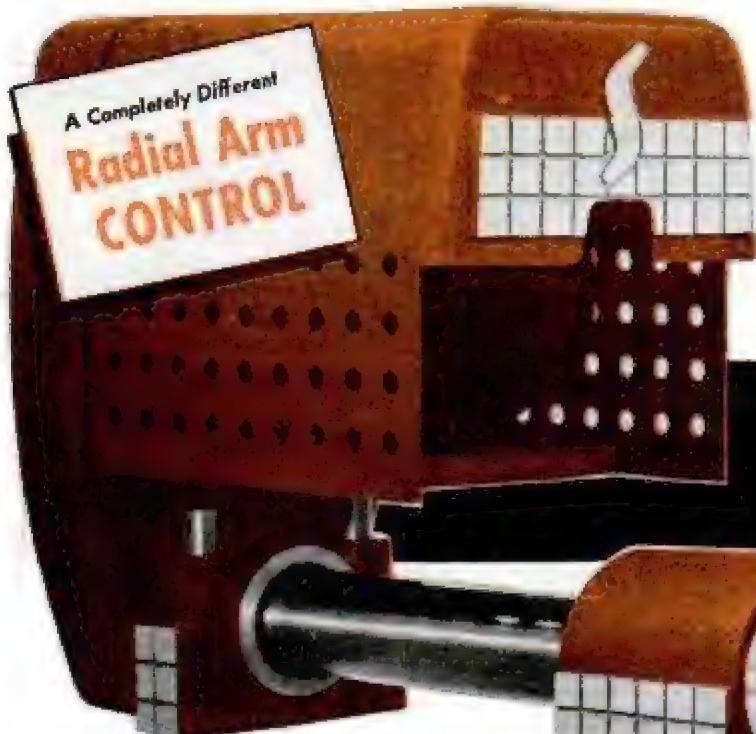
But according to Bill Levitt, the man who really started all this, prefabrication is not the answer. Instead of making a house in a factory, where the assembly goes past the worker, Levitt makes a factory of the entire building site and moves his workers past the houses. The 26-major-construction operations start only after all site grading and improving is complete, and concrete streets are all poured.

Once the site is ready, machines roar in to excavate for hundreds of footings and slabs at a time. Teams of baby bulldozers, about the size of Junior's pedal-pumping auto, spread gravel bedding in the holes.

You'll never see a saw on a Levitt job. In a vast "shop" area, every stick of lumber is precut to size. Entire assortments for one complete house are "combat loaded" (stacked in the order they'll be used) on a single truck, and whipped out to the site.

While Levitt prefabs no chunks of house, he uses plenty of stunts for preparing materials so there's no wasted time on the site. On a simple jig consisting of two pylons a few yards apart, you can watch men wrap precut lengths of radiant-heat copper tubing into "figure eight" bundles.

(Continued to page 294)



COMPLETE WITH STAND

Mounts work table, provides ample storage for attachments. Tilts back on casters for easy moving.

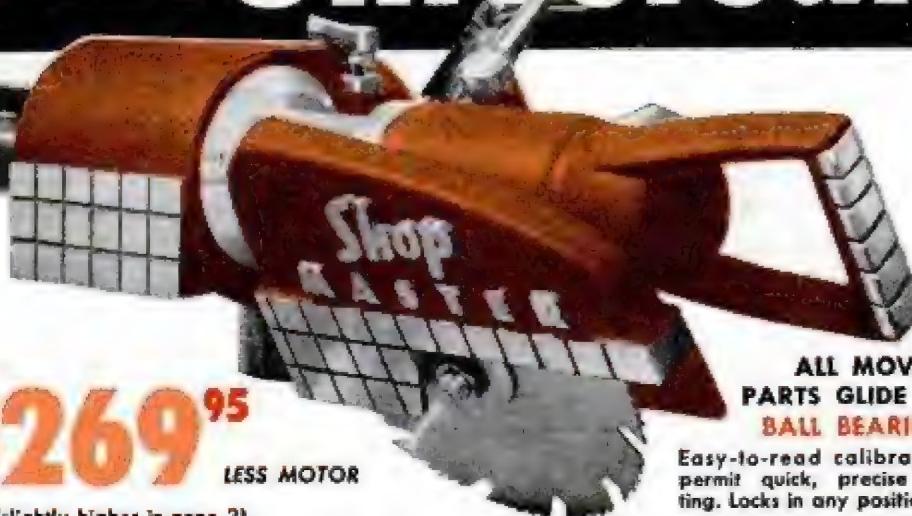
\$269⁹⁵

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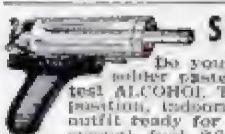
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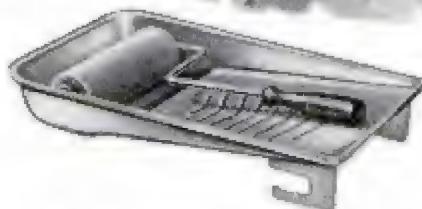
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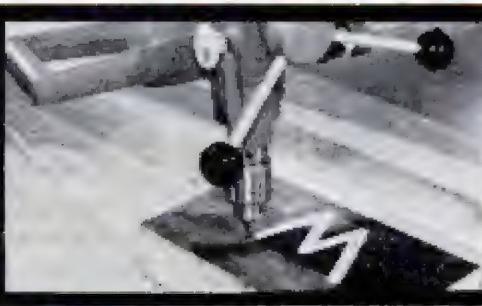
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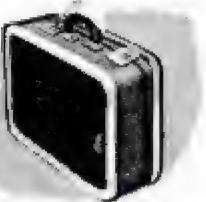
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FAVORITE FOR 25 YEARS

BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY



On the site, workers just stretch out the package and it falls into precise folds, all ready for cement to be poured over it.

Rafters are cut eight at a time on preset saws. Tricky truss-type rafters, that will be bolted to tie beams on the site, require steel rings sunk into both members where they'll join. These add strength to the joint and prevent splitting. Despite precision needed to drill the circular grooves and bolt holes, no fancy jigs are used. "We just set up two drill presses the right distance apart on a long bench, lay the two by four in there against stops, bring down both drills at once and we never miss," explains Irwin Jalonak, Levitt's top construction chief.

The outfit comes up with brilliant ideas for labor saving and cost cutting. Under-coating and hand painting home interiors would be costly. Levitt solved it by getting a paint company to invent a white base paint in which emulsion-coated flecks of green are floated. The emulsion keeps the colors from mixing. But when shot from a high-powered sprayer, the emulsion skin on the green droplets bursts. The result is an even pattern of uniform flecks. The walls have an expensive-looking four-toned effect on a surface that is rugged and washable. Except for windows and fireplace, the whole interior gets a dose of this spray in one fast operation.

Setting shingles costs money, and although a manufacturer fabricated specialized shingles for Levitt, which were long enough to span studs, they still didn't go up fast enough. Today, Levitt houses are weather-coated with huge asbestos panels, striated with color to hide the seams. They go up much faster and are just as durable.

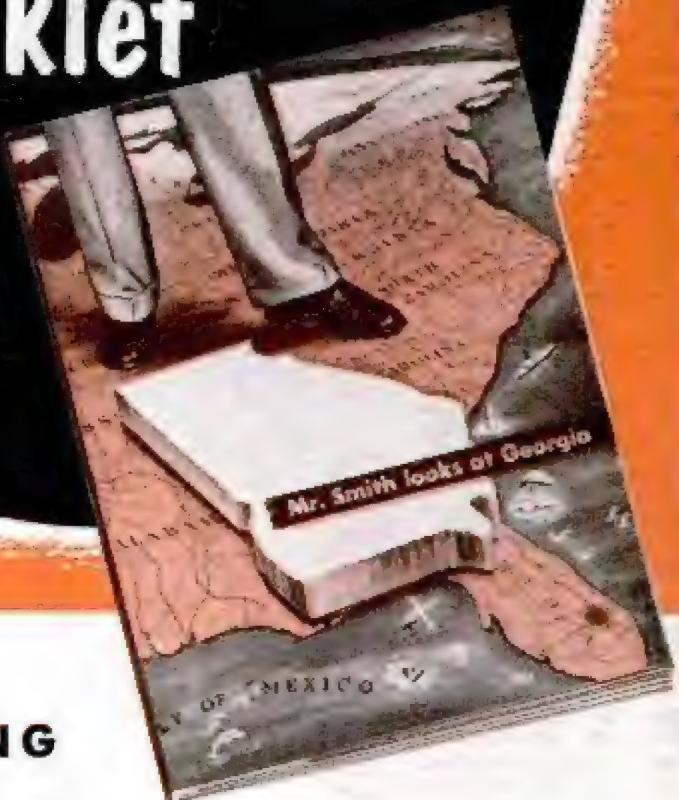
Bored with the wasted and costly utility space required for the standard furnaces, Levitt badgered York-Shipley into fabricating a complete kitchen-counter-height furnace and boiler no bigger than an automatic washing machine. He puts it in the kitchen, where its stainless-steel top not only matches the counters, but becomes an extension of them. "Our heating system costs less than any system we could put in," says Jalonak. "Yet radiant heat is a luxury item on an individual house basis. But because ours saves building a utility room, makes usable kitchen counter space, and works at top efficiency, we actually save money with it."

Alfred Levitt's right-hand man John Sierks, who worries about architectural features, sings the second verse to this song. "Thermopane window walls are a luxury item," he points out. "But they—along with top-grade insulation—make it possible for us to use a smaller output

(Continued to page 296)

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(94,000 BTU) heating unit at much less cost than we'd have to otherwise. Hence, we actually save money with the double-barreled glass."

And so it goes. Revolutionary finishing touches cut costs. Levitt's huge closets have no doors. Instead, they're shut off by sliver-thin bamboo curtains that ride back and forth on overhead tracks. "They don't get in the way, and women like them better anyway," says Bill Levitt. Bricks for the chimney and the three-way fireplace are oversize (3 inches by 10 inches) so masons build faster while laying fewer.

Savings like this enable Alfred and John to add eye-catchers like the stainless-steel tiled bathroom. The tiles, incidentally, measure 8 inches by 8 inches, so fewer need be set, "and it takes no expert to do it," says Sierks.

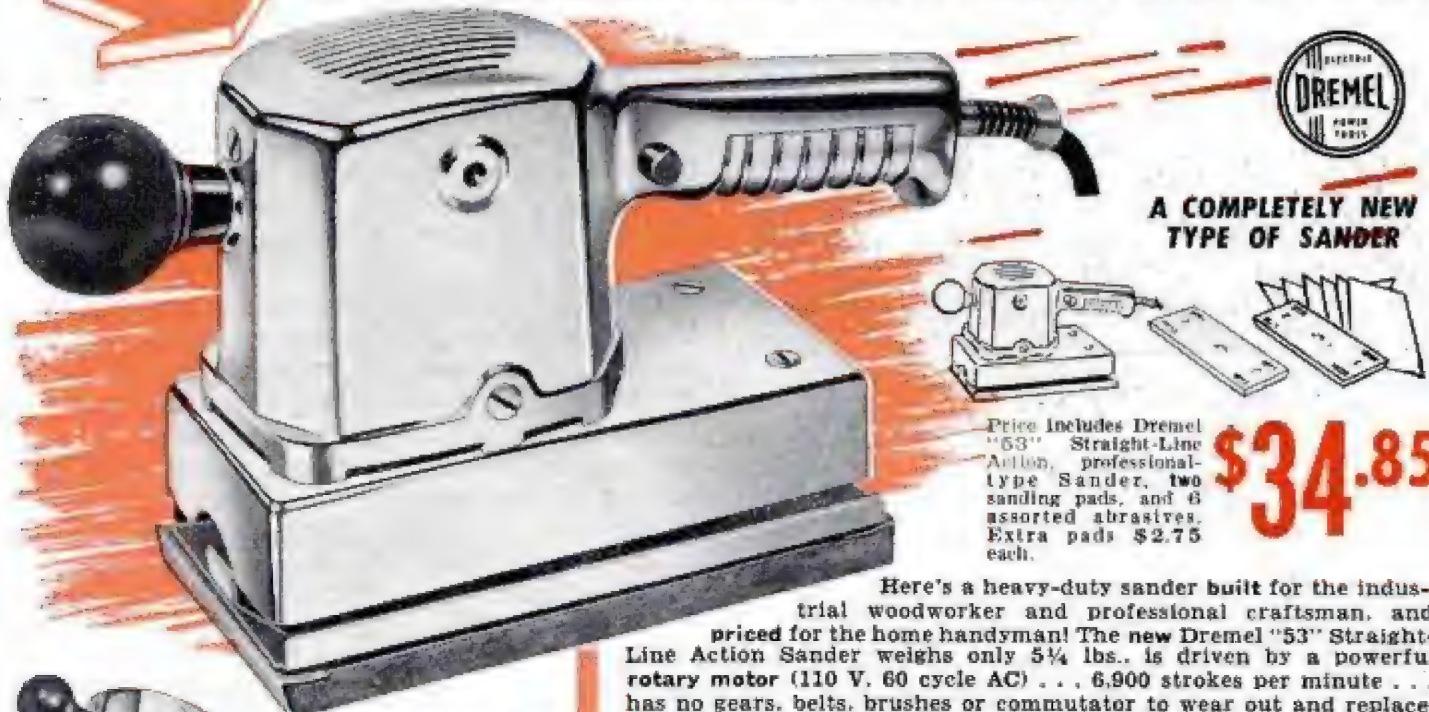
Add it all up, and out comes a vast city of new housing at bargain prices. What are the disadvantages, if any? Some people feel they'd hate having neighbors crowding in on all sides. Others talk about "monotonous sameness" of houses. In well-planned communities, these old "real estate development" complaints seem to lose validity. Lots in Levittown, Pa., measure at least 70 feet by 120 feet. Even the Levittowner, most numerous of the houses, with the same basic floor plan in every unit, has four exterior designs in which the carport plays a variety of drastic changes. You'll find it in seven different colors, alternating broadside and lengthwise to the lot front. Hills and dales, woods and plains, provide more housing variety than you'll find on most town streets.

Community spirit plays a big role in any locality, and in some projects—like Levittown—a book of rules awaits every purchaser. No wash may be hung out on weekends, it says. Laundry must go on drying trees—not lines. If you don't mow your built-in lawn, Father Abraham may threaten to send his boys around, do it for you and send a bill. No fences are sanctioned. These are some of the penalties for your bargain-priced home in Levittown. Most mass builders put you strictly on your own good manners. And, actually, the Levitts have no intention of enforcing their regulations. "We don't have to," they say. "The neighbors keep each other in line. We just give them a rule book to follow." Having invested time and money in these ventures, and maintaining an interest in the shopping centers which bring them fat rent, the Levitts don't care to see values tumble around them.

Bill Levitt thinks he's done a pretty good job, too. "Ninety percent of the people in Levittown pray for us," he claims. ★ ★ ★

NEW DREMEL STRAIGHT-LINE ACTION SANDER

A PROFESSIONAL TOOL AT A HANDYMAN'S PRICE!



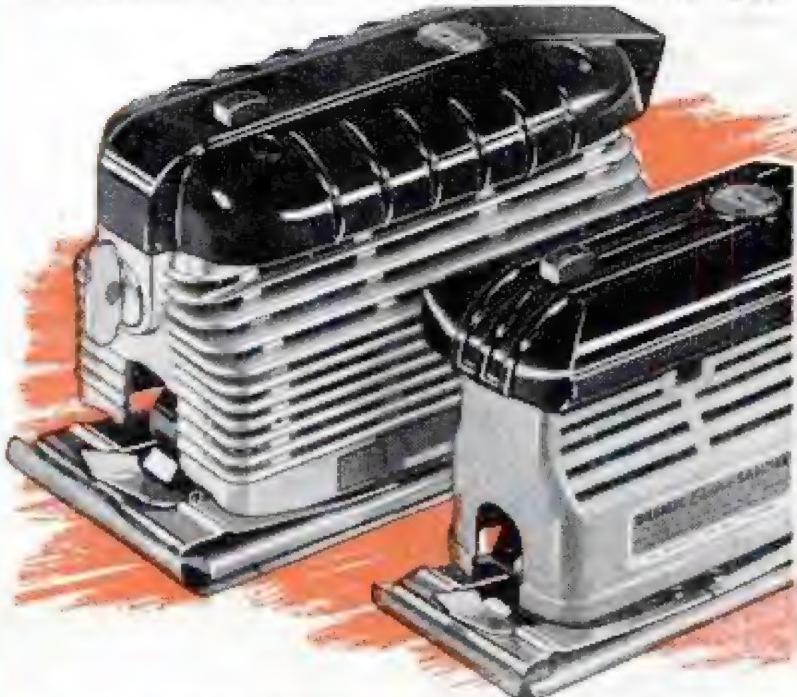
A COMPLETELY NEW TYPE OF SANDER

Price includes Dremel "53" Straight-Line Action, professional-type Sander, two sanding pads, and 6 assorted abrasives. Extra pads \$2.75 each.

\$34.85

Here's a heavy-duty sander built for the industrial woodworker and professional craftsman, and priced for the home handyman! The new Dremel "53" Straight-Line Action Sander weighs only 5 1/4 lbs., is driven by a powerful rotary motor (110 V. 60 cycle AC) . . . 6,900 strokes per minute . . . has no gears, belts, brushes or commutator to wear out and replace. Dremel Straight-Line Action guarantees satin-smooth finishes you'll be proud to show. Detachable paper holder speeds up paper changes. Use it for WET or DRY, coarse, medium or fine sanding . . . the Dremel "53" is positively the most versatile . . . the greatest sander value in today's market.

THERE'S A DREMEL SANDER FOR EVERY USE



DREMEL MODEL "2000" SANDER-POLISHER

Perfect for small shop use, home repair, and workshop projects. Choice of craftsmen for fine finishing operations. Features Dremel "Straight-Line Action": 14,400 strokes per min.; 3 lb. wt.; 21 in. L x 8 1/2 in. H sanding surface. Model "2000" Sander-Polisher, 25 a.s.t.d. abrasives, 1 polish pad in sturdy steel carrying case. **\$24.50**

DREMEL MODEL "A" SANDER-POLISHER-MASSAGER

Lighter capacity model, a favorite for general home maintenance, hobbywork, furniture polishing, etc. Effective body massager. Features: Dremel "Straight-Line Action"; 11 in. W x 21 in. H; 12 sq. in. 1248 "X53" sanding surface. Model "A" Sander-Polisher-Massager, 6 abrasives, 1 polish pad, 1 massage pad. **\$14.85**

PAT. APPLIED FOR

**EASY ON!
EASY OFF!**

Unique paper holder is detachable. Grits can be switched quickly without bothering some paper change.

Here's Why Craftsmen Approve... Use... Only Straight-Line Action Sanding!

Wood fibers lie with-the-grain . . . are directional. Sanding cross-grain is much like brushing a suede jacket against the nap. It leaves marks or "scratches." Sanding with-the-grain is like brushing the suede with the nap . . . leaving a velvet-smooth surface, entirely scratch-free. Shown below are four common types of sanding actions. Only Dremel "Straight-Line Action" sands 100% with the grain . . . Only Dremel can guarantee 100% scratch-free finishes.

ROTARY
(cross-grain)
Action



ORBITAL
(cross-grain)
Action



ARC
(cross-grain)
Action



DREMEL
STRAIGHT-LINE
(with-the-grain)
Action



SEE YOUR FAVORITE DEALER: Dremel Tools are sold at better dealers everywhere. If your dealer can't supply, order direct on a five-day trial, money-back guarantee. Remit in full, and we will ship postpaid. Or, send only \$2.00 now, pay postman balance plus postage and C.O.D. fee.

DREMEL MANUFACTURING COMPANY, Dept. 113-K, Racine, Wisconsin



make your **HANDS** **MORE CREATIVE** with **X-acto Knives and Tools**

Creative hands can be your greatest asset . . . X-acto knives and tools help the intelligent coordination of active minds and agile fingers . . . they can develop skill and dexterity in any art or handicraft you select.

Whether it's boat whittling, model airplanes, wood-carving, leathercraft, model railroads or any other handicraft, you can make your hands more creative with "designed-for-the-job" precision-engineered X-acto knives, tools and handicraft kits.

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From 25¢ to \$30.—at dealers everywhere.



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Send 20¢ to cover postage
for our new illustrated
28-page Catalog.



X-acto Crescent Products Co., Inc.
440 Fourth Avenue, New York 16, New York

How to Finance Your Home

(Continued from page 175)

prudent lenders will suggest that the veteran refer the contract, before signing, to an attorney.

On a 20-year loan on the above-mentioned \$10,000 mortgage at 4½ percent interest the payment for principal and interest would be \$63.27 per month, to which is to be added a monthly reserve for fire and other hazard-type insurance, and for taxes. These two items will add between \$10 and \$20 a month to principal and interest payments.

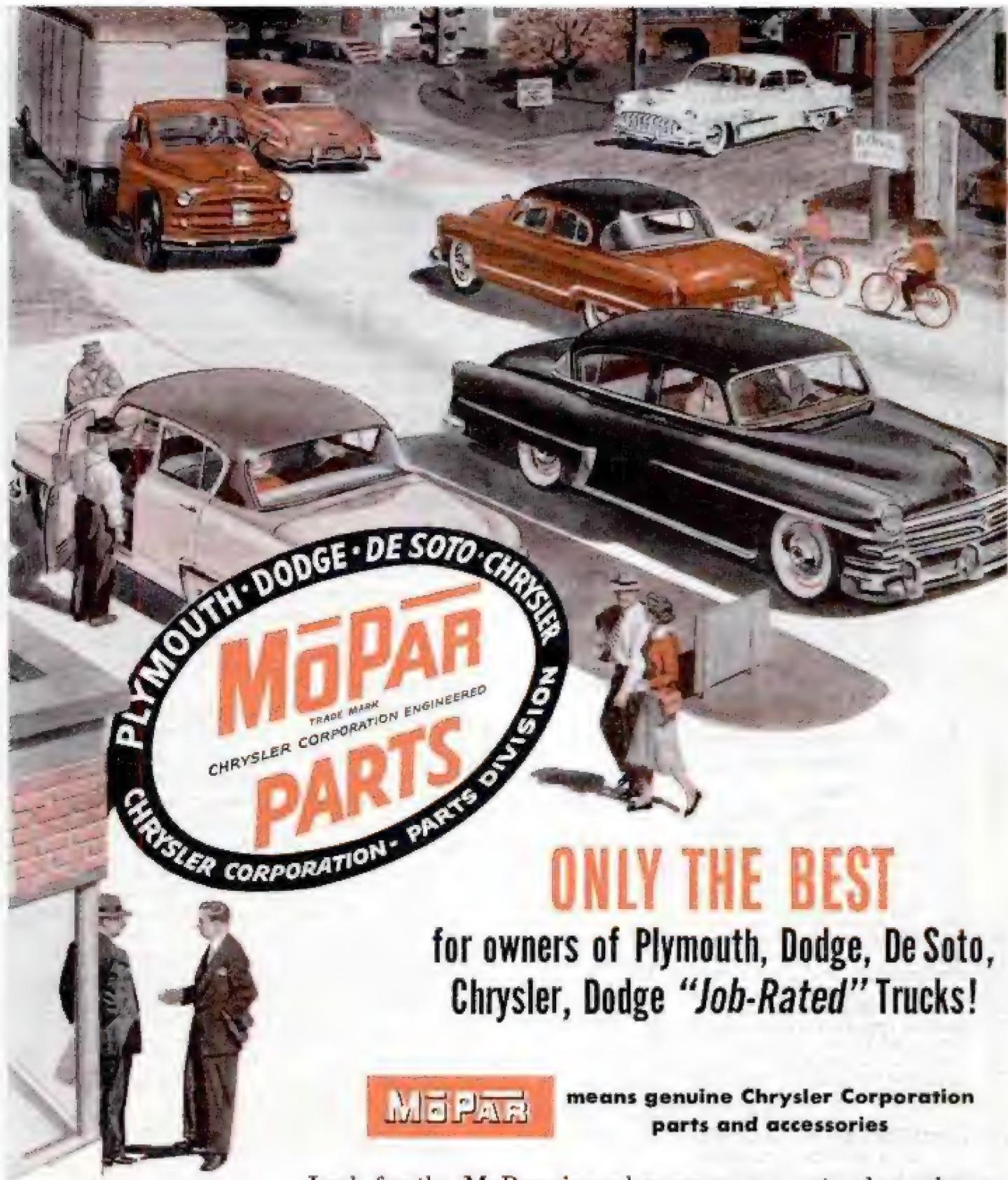
Usually, a lending institution feels that the monthly wage of the borrower should be 4 or 4½ times his monthly mortgage payments. This, of course, may vary with the number of dependents and other obligations of the borrower and, therefore, the ability of the borrower to meet his payments is quite a determining factor in arriving at the ratio between payments and income. However, using the 4 or 4½ times income figure as a yardstick, the average borrower's income should be approximately \$330 per month in order to support the \$10,000 loan.

FHA Loans. These loans are to be obtained from a lending institution for the FHA is not a bank or a loan association. In the case where a prospective borrower is building a new home, he should submit plans to the lender, specifications, contractor's bid, the location and size of the lot and the cost of lot before construction is commenced. The applications for the loans sought must be referred to the local office of the FHA before construction has started. If construction has been started and advanced, the lending institution must wait until the house is substantially completed before submitting the application to the FHA. This is intended to mean that the house is habitable and that such minor items as decorating, the hanging of electric fixtures, sidewalks and the final coat of exterior painting is about all that remains to be done. Then, of course, the FHA inspector does take into consideration the reputation of the contractor and the general type of construction in determining the advisability of insuring the loan.

From this you can readily see where it is advisable to hold off construction until the loan has been approved, for after its approval the building is subject to the periodic inspections by the FHA inspector in the neighborhood who can see that the owner is getting approved-construction.

Under the FHA-type of loan it does not matter to the lender what the borrower

(Continued to page 300)



ONLY THE BEST

for owners of Plymouth, Dodge, De Soto,
Chrysler, Dodge "Job-Rated" Trucks!

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means genuine Chrysler Corporation
parts and accessories

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CORPORATION**
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has to pay for the prospective home. The amount of the loan is determined on a basis of not over 80 percent of the valuation of the land and building as appraised by the FHA. Second mortgages are not permissible on FHA loans. The borrower must state in his application that his down payment is coming from his cash or liquidation of assets listed in his financial statement which should accompany the application for the loan.

The FHA may insure a mortgage up to \$16,000 (no matter if the borrower pays \$25,000 or \$45,000 for a building) and up to 80 percent of the appraised value of the property on either a new or an older dwelling, and the mortgage may call for repayment over a period of 20 years or less; but when the mortgage is approved for insurance before construction starts it may have a longer term and, if the home is to be occupied by the owner and if the mortgage amount is \$9450 or less, it may merit a rating of higher value than 80 percent. On a loan of \$5700 or less, the ratio of loan to value may be as high as 95 percent and the term may be as long as 30 years, thus reducing the down payment made by the borrower and his monthly payments on the loan.

Let us assume that a buyer is purchasing a home for \$22,000. It is conceivable that for loan appraisals the FHA might be inclined to appraise the home at only \$20,000. (Actually, it might be lower, depending on detracting influences such as age or the proximity of commercial buildings.) Let us assume that on this \$22,000 purchase a commitment of \$16,000 is issued for a 20-year loan at 4½ percent interest. Therefore, the borrower will be required to come up with \$6000 of his own free money and the loan of \$16,000 will therefore be payable monthly as follows:

Principal and interest.....	\$101.28
FHA mortgage insurance premium.....	6.36
Reserve for fire and other hazard insurance.....	3.00
Reserve for taxes (estimated)....	20.00
Total monthly payment.....	\$130.64

In addition to the \$6000—and this also applies to veterans' loans—the borrower must pay his share of title expenses, recording of the mortgage, deposits for back taxes, insurance, etc., as well as the usual fee charged by the lender for arranging the loan, all of which the lending institutions are willing to estimate in an itemized form before the prospective borrower obligates himself.

Conventional loans. These are sometimes

(Continued to page 302)



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A lasting "do-it-yourself" repair—ideal for hot or cold water faucets! Lasting—economical—easy to install. Lasts 10 to 20 times longer than ordinary bibb washers. Stainless steel and corrosion resistant metal parts—molded neoprene washer disc.

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Say You Saw It in Popular Mechanics

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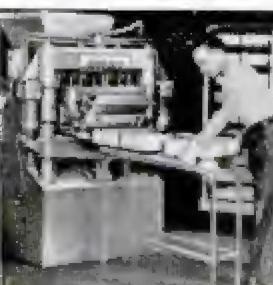
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Bob Davis says:

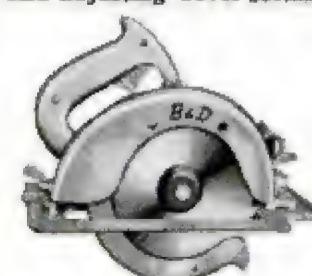
Black & Decker Utility Tools let you do it yourself and save high labor cost!

FOR SNUG FIT on storm windows and doors, trim them at same angle as outside jamb and stiles. Find angle by placing saw shoe against jamb and adjusting bevel setting.



UTILITY 6" Heavy-Duty Deluxe Saw is 10 times faster than hand sawing. Has built-in depth-and-bevel adjustments, telescoping guard and instant-release trigger . . .

\$76.50



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UTILITY PORTABLE JIG SAW makes curved, straight or irregular cuts in most every material. Cuts own "entrance" hole for pocket cuts in wood. Complete with 5 blades . . .

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FOR SATIN FINISHES, sand object and then wet thoroughly with water. Drying causes grain to swell, after which one more sanding gives super-smooth surface.



UTILITY NO. 44 SANDER—A fast-cutting, powerful, lightweight orbital sander. Gives a satin-smooth finish and eliminates hand sanding. 3½" x 9" sanding plate. **\$46.95**

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dealers everywhere.



ATKINS SAW DIVISION

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Please send me free booklet, "Tree, Shrub and Hedge Pruning."

NAME.....

ADDRESS.....

CITY..... STATE.....

less costly to the borrower for a number of reasons. One principal reason is that loans which do not require monthly payments, save on bookkeeping, or servicing costs. Also, if the borrower has a substantial amount of cash toward the purchase price of a home, he may be able to obtain a conventional loan at a lower rate of interest due to the reduced risk. Borrowers who have business dealings with banks or insurance companies sometimes are able to secure a low rate of interest as customer relations are often a factor in determining rates.

The amount banks will loan on conventional loans secured by improved real estate is limited by law in most states. The Federal Reserve Bank suggests that loans be limited to 60 percent of the appraisal, and the National Banking Act limits the national banks likewise to 60 percent. Federal Reserve member banks and national banks are not permitted to carry loans having a maturity in excess of 10 years. However many banks renew loans on the expiration date.

Savings and loan associations and other institutions not under the Federal Reserve or National Banking Act may grant considerably higher loans for longer periods of time. These associations also permit open-end mortgages which make it possible for the owner to borrow additional funds (frequently needed for improvements or repairs) without refinancing. If you are borrowing from a savings-and-loan association, find out if they make construction inspections to protect both your and their investments. Some associations have more rigid inspection practices than the FHA ordinarily provides.

The accepted arrangement on most conventional loans today is to permit the borrower to make additional payments each year during the life of the loan without penalty. Make sure of this privilege before signing final papers. FHA permits a borrower to make prepayments of up to 15 percent of the original mortgage in any one year.

We have not gone into the matter of fees or commissions or requirement for insurance and many other items that are often required by a lender. These matters should be weighed by the borrower and discussed by him with his attorney or someone familiar with mortgage banking. ★ ★ ★

Free How-To-Make-It Index

Write the Bureau of Information, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, for your free copy of the latest index to all the how-to-do-it sections of Popular Mechanics

Your Ford won't even know it's winter -



...if you use parts you can trust!

When you get your Ford ready for winter . . . and find that replacements will add to its zip . . . insist on Genuine Ford Parts like the three below. Here's why they make a big difference:

Ford oil filter cartridges are Track Tested from 20,000 to 40,000 miles. Both full-flow and by-pass filters are designed to remove dust, and other oil contaminants quickly and thoroughly *without* removing useful detergents!



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Available at all Ford Dealers and the selected independent garages where you see the Genuine Ford Parts sign.

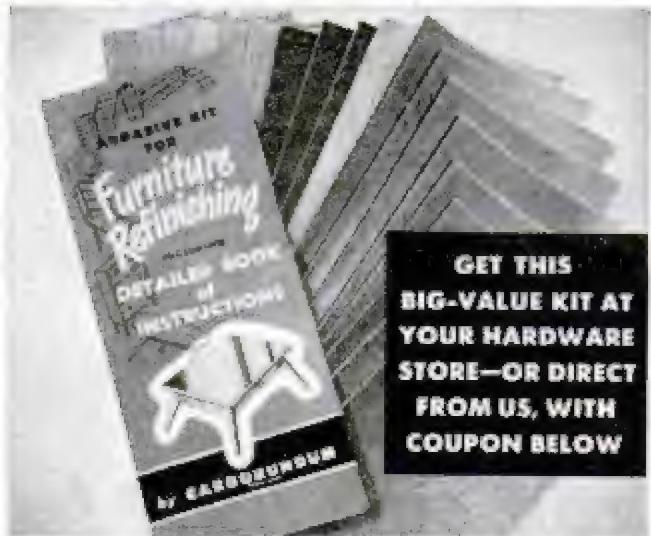
Keep your Ford all Ford

Refinishing Furniture?



Here's a kit-full of
GOOD SHORT-CUTS
from "Handy" SANDY

Best news of the year for all you home-craftsmen is CARBORUNDUM's just-out "Furniture Refinishing Kit"—man, it's a dandy! A big 16-page instruction book takes you step by step . . . removing the old finish—staining, filling, sealing—sanding and rubbing final finish coats. There are 22 sheets of sandpaper, already cut to fit a sanding block—in 8 different grits and grades. Not just "sandpapers", but the top-quality papers the professionals use . . . garnet, silicon carbide waterproof, aluminum oxide moulding cloth.



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YOUR HARDWARE
STORE—OR DIRECT
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It's worth over a dollar of anybody's money, but your hardware store or building material dealer sells it at about 90¢. All stores **should** have it in stock, but of course there'll be some who won't. If your store is out, send me his name and address, and a dollar bill, and I'll send your Kit direct to you, postage paid. Use the handy coupon below—and please give me your dealer's name and address, so he'll have stock next time you go back. And you **will** go back, I'm sure—that's how good these sandpapers and easy instructions are!



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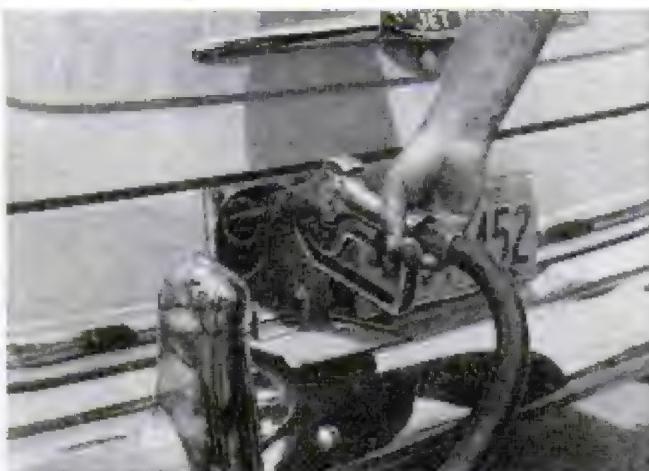
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City..... Zone.... State.....

90-227

The Owners Report on The Hudson Jet

(Continued from page 122)



Some owners disliked high lip on trunk, but location of gas-filler cap below rear deck makes it necessary

high-speed braking or mountain driving. Due to the soft front end, rear-wheel braking (without the car loaded) could be better. The front end has a tendency to drop down abruptly when the brakes are applied quickly.

The steering is excellent, with four turns of the wheel from lock to lock. Steering-wheel road shock is almost nil. Center-point steering contributes to easy turning of the wheel.

Terrific head and side winds were encountered through Oklahoma with rain and hail. The Jet body is tight and no squeaks or rattles developed, although a small water leak in the left window was noticed when driving in a heavy rainstorm. As in larger Hudsons, the body and frame are welded together in one piece. The step-down feature is retained, although not as pronounced as in the larger Hudsons.

The solid doors open easily by push-button handles. Rotary latches make for easy operation. Three turns of the cranks open or close the windows—an excellent ratio. Road noise and body rumble seem to be less than in many higher-priced cars.

The excellent instrument panel is plastic-topped to prevent sun glare. The large speedometer dial is easy to read and well located with no obstruction of any kind, as Hudson has eliminated the useless top half of the horn ring. Front vision is excellent and the wrap-around rear window affords good rear vision, too.

The springing and cushions are average. There is sufficient legroom in front for a tall person, but lack of legroom in the rear. Headroom is satisfactory. Legroom is a problem with any short wheelbase car—either trunk space or legroom in the rear

(Continued to page 306)



Worn or Damaged THREADS

Better than new in seconds

With *Heli-Coil** Screw Thread Inserts, your worn or damaged threads are better, stronger than new in seconds. Just...

- 1 Drill out old threads.
- 2 Tap new threads with *Heli-Coil* tap.
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Simple *Heli-Coil* tooling—that will never wear out—costs as little as \$15 per thread size. Inserts as low as 3¢ each. Available for all machine screw sizes, also spark plug and pipe threads.

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IRON BENDER forms hooks, brackets, eyelets, etc. Capacity 1/4 x 2", 5/16 x 1 1/2". All steel. \$9.50. 30" CURVE FORMER. Forms straight and tapering pipes 2" to 2 ft. in diameter. 20 gauge, express collect \$9.50.

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Exclusive MONEY-MAKING features:



Belsaw Multi-Duty Planer for cabinet shops, builders, lumber yards, woodworking plants and spare time work shops... Now you can convert low cost rough and random size lumber into high priced cabinet finished stock... Easy to make flooring and popular patterns. Belsaw quickly returns cost with savings on raw material... profits on finished stock.

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LOW DOWN
PAYMENT
EASY
TERMS



GOOD-BY LEAVES!

Sweep, gather, and carry away leaves—all in one operation. Lift out basket, fold-away storage—the Parker lawn sweeper has all the features. Manual and motorized models on display at nearby dealers.

\$33.50 and up, zone 1.

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Please send me free illustrated Parker sweeper booklet and name of nearest dealer.

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Last Year's Profit \$3,000!



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FOLEY automatic SAW FILER

"Last year's profit amounted to \$3,000. Not so bad for a one-man outfit" — from Chas. C. Hough. James B. Williams wrote us—"I made \$765 last year filing saws, and it sure comes in handy. I do this work in my spare time." Men in communities of all sizes make up to \$3 or \$4 an hour with the Foley Saw Filer working full time or part time.

It's no trick to take care of the saw filing for your neighborhood hardware or lumber dealer — plus looking after the saws for farmers, townspeople, manual training departments and factories. The Foley files all hand saws, also band and cross-cut circular saws. It's a cash business, no canvassing, no eyestrain and no experience needed.

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must be sacrificed. The Jet trunk is quite large and even though it has little rear legroom, some larger club coupe models of various makes actually have no more.

The brake and throttle pedals are well located, although a wider brake pedal could be used. The hood is rather stubby. The hood ornament gives the appearance of being an air scoop but actually is nonfunctional. I'd like to see a few holes punched in it to permit fresh air to flow under the hood and over the engine.

It is fun to drive the Jet and anyone who likes a little competition now and then can

1953 HUDSON JET SPECIFICATIONS

	ENGINE	Optional Equipment
Type	6-cyl., in-line; L-head	
Bore and stroke	3.0 in. x 4.75 in.	
Piston displacement	202 cu. in.	
Cylinder-head material	Cast alloy iron	Cast alloy aluminum
Compression ratio	7.5:1	8.0:1
Carburetor	Single downdraft	Two downdraft (Twin H-Power)
Brake horsepower	104 at 4000 r.p.m.	106 at 4000 r.p.m. (cast iron head) 114 at 4000 r.p.m. (alloy head Twin-H)
Transmission	Conventional 3-speed unit standard on all models	Overdrive or Dual-Range Hydra-Matic Drive

CAPACITIES	
Oil	5½ qt.
Water	15 qt.
Gasoline	15 gal.

GENERAL	
Steering ratio (over-all)	20.2:1
Steering wheel (lock to lock)	4 turns
Turning diameter	36 ft.
Brakes	Conventional hydraulic with riveted linings
Tire size	5.90 x 15 (Jet) 6.40 x 15 (Super Jet)
Shipping weight	2700 lb.
Wheelbase	105 in.
Tread, front	54 in.
Tread, rear	52 in.
Over-all length	180⅓ in.
Over-all width	67⅓ in.
Over-all height	60⅔ in.
Road clearance	8⅓ in.

INTERIOR DIMENSIONS	
Front-seat width	58 in. (hip room)
Rear-seat width	58 in. (hip room)
Front headroom	36.375 in.
Rear headroom	35.625 in.
Front legroom	41.875 in.
Rear legroom	38.5 in.

surprise other drivers with Jet performance. In many instances I made faster average time between certain points than I have made in past tests with more powerful cars. One day we drove 740 miles with little fatigue. I consider it far above average and it is certainly an economical automobile to operate.

Drivers of longer and heavier cars, once accustomed to the Jet, will find the performance and maneuverability refreshing, both in traffic and over winding roads.

The Jet price is not so low as some people expect it to be, but perhaps the convenience of a smaller car plus the economy features will offset the price situation with some purchasers.

★ ★ ★

Why pay more?

You can install
a guaranteed

KENTILE FLOOR

like this for only \$27^{50*}



A KENTILE FLOOR LIKE THIS COSTS
\$9 to \$22 LESS THAN TILE FLOORS
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YET KENTILE IS GUARANTEED!



You can't imagine how easy it is to install your own Kentile Floor until you've actually done it. Mix or match your choice of the 25 "lovely-to-live-with" colors. Kentile resists soil and stains. And, after parties or just family-fun, Kentile is easy to mop clean.

It's easy to keep glistening like new with an occasional no-rub waxing, too. These modern colors can't get dull or wear off . . . they go clear through the rugged, durable tile. That's why more people buy Kentile . . . because Kentile gives more value.

Only KENTILE DEALERS have these money-saving buys in GUARANTEED FLOORS

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Kentile, Inc., will furnish new tile without charge for any damage that wears out . . . and on which colors wear off . . . during your own occupancy of your own home wherein you have installed Kentile or have had it installed by an authorized Kentile Dealer. This guarantee does not apply to damage caused by your improper handling or your failure to follow the instructions for installation and/or maintenance available at your Kentile dealer's. This guarantee must be presented if claim is made for new tile.

*Price quoted is for a floor approximately 11'6" x 9'3" installed by you. Your floor may cost less or slightly more depending on size, colors and freight rates. See your local Kentile, Inc. Dealer for FREE estimate. His name is listed under FLOORS in your Classified Telephone Directory. In Canada, T. Eaton Co., Ltd.

KENTILE, INC., 58 2nd Avenue, Brooklyn 15, N. Y.

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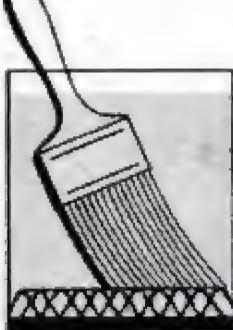


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Now it's easy
to clean brushes

PAINT TRAP

**Reconditions old hard brushes
Thoroughly cleans after using**

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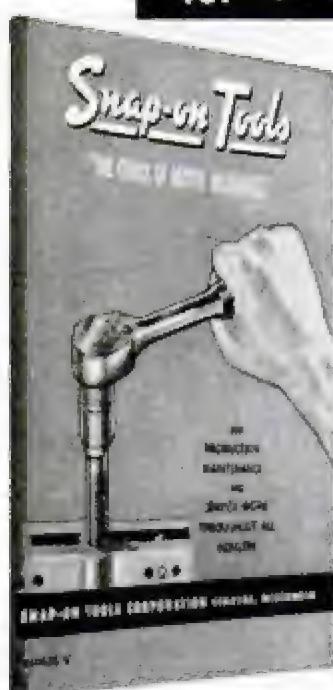


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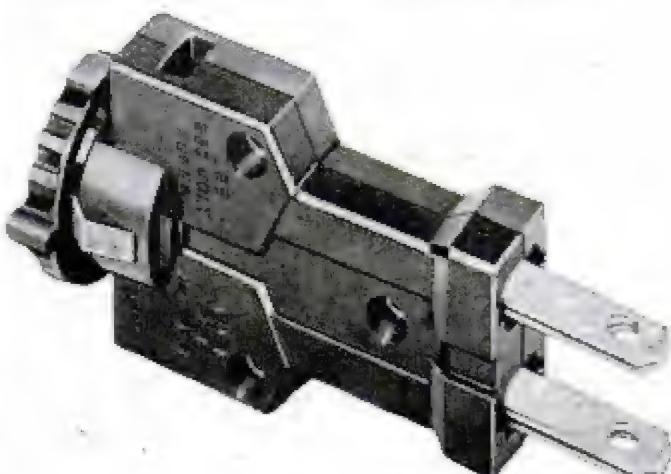


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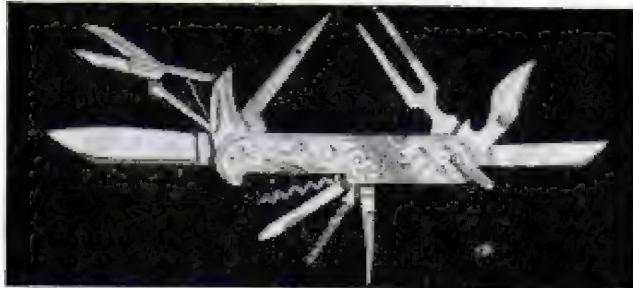
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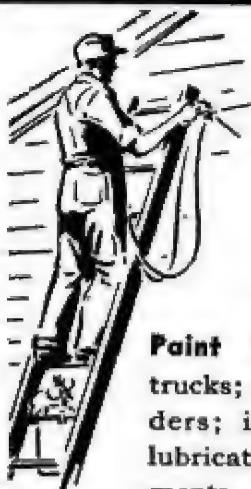
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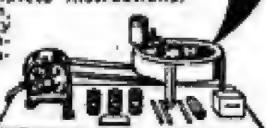
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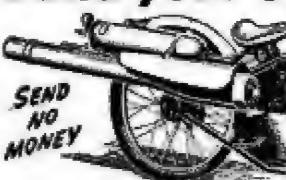
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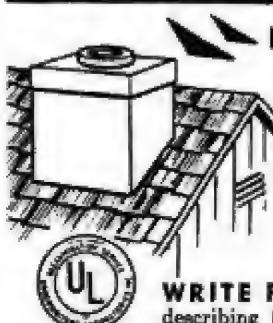


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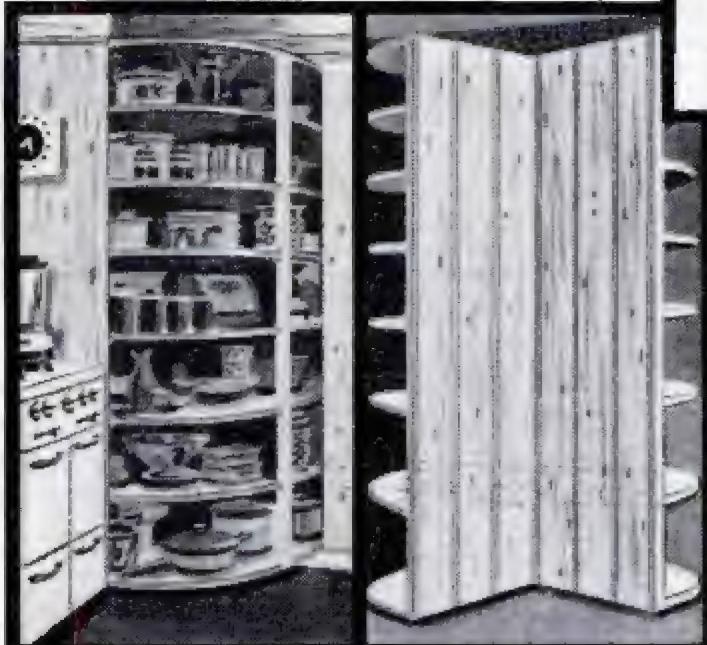
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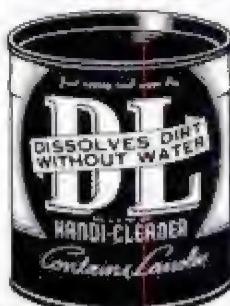
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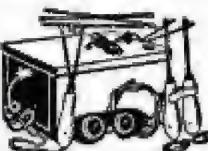
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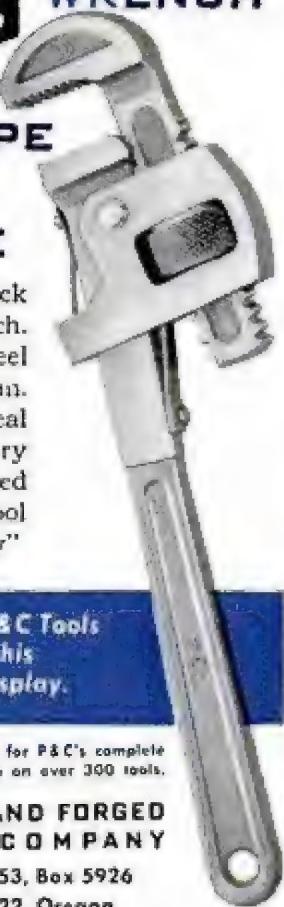


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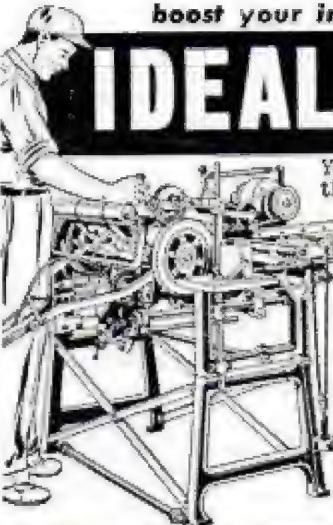
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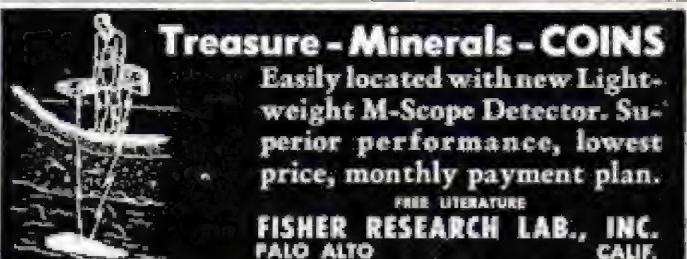


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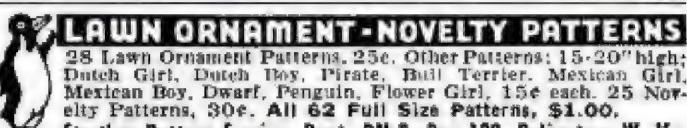


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28 Lawn Ornament Patterns. 25c. Other Patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 15c each. 25 Novelty Patterns, 30c. All 62 Full Size Patterns, \$1.00. Struther Pattern Service, Dept. DM-8, Box 128, Belington, W. Va.



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Portable DITCH-WITCH digs 2" to 6" clean, even ditches to 36" depth in all types of soil. Complete unit—self propelled—outdigs 8 men. Four rugged models.

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Say You Saw It in Popular Mechanics

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ONLY \$2.50

BIG 5 OZ. CAN
More Than Enough
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SPRAY ON FAST AND EASY

Amazing new invention! Now you can give **YOUR** car that \$80-look of the smart new tinted windshields you see on new autos ... at a tiny cost! Just spray on Tint-Shield. Eliminates blinding sun and headlight glare. Washable, will not peel . . . stays on smooth and clear for years . . . Rush your order today.

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Farm drainage, home building, reclamation projects, highway construction. From these and other sources come the biggest demand for drain tile in history. More local plants are urgently needed.

Millions of dollars' worth of drain tile are used annually. Much of it, ordinarily, is shipped from far distant points. Local manufacturing is economical, logical, profitable. The Champion Drain Tile Machine makes manufacturing easy. Pares production costs. Requires no skilled labor. Makes all sizes from 3" to 12". Yet requires only a moderate investment.

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Car owners who are wasting money, getting poor gas mileage due to over-rich mixtures, will be pleased to learn how to save gasoline by VACU-MATING OVER-RICH MIXTURES. Vacu-Matic fits all cars, trucks and tractors. Automatic and operates on the supercharge principle. Easily installed in a few minutes. SALES MEN WANTED! Big Profits

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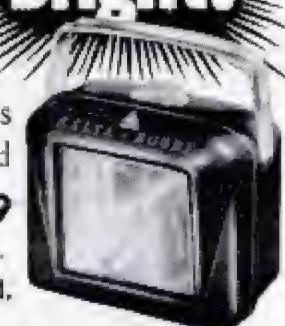
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Just right for carrying or storing — it's palm size! Made of heavy gauge metal. Switch glows in the dark. Uses 2 standard $1\frac{1}{4}$ " batteries. See \$1.89 less batts.

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Mechanic's Net Price, at your electrical or refrigeration wholesaler.

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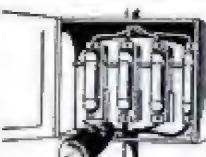


AMPROBE

Junior

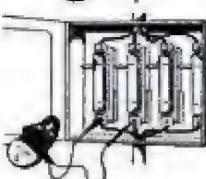
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IT'S A SNAP-ROUND AMMETER

Measures current instantly without shutdowns or ammeter connections. Just snap the trigger-operated jaws around one conductor (insulated or uninsulated) and you have your reading.



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To measure voltage, simply plug the test leads into instrument and clip to load. You get an accurate voltage reading on a full-size calibrated scale without doubt or guesswork.

Combines tester ruggedness with instrument accuracy.

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MODEL "50"	0-50	AMPS AC	0-150/600 VOLTS AC
MODEL "100"	0-100	AMPS AC	0-150/600 VOLTS AC

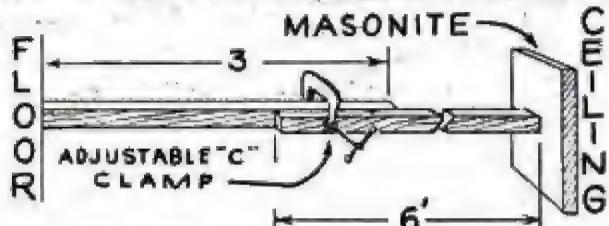
With the Amprobe Junior, you can diagnose service calls faster under actual load, check line voltage, determine if wiring is adequate, balance loads, locate grounds, trace shorts, check motor overloads, etc. Ask your wholesaler for a demonstration. For descriptive literature, write to PYRAMID INSTRUMENT CORPORATION, Dept. PM 103, Lynbrook, N. Y. (Export Div.: 458 Broadway, N. Y. 13. Cable: Morhanex).

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Two new "How To" ideas, short cuts to speedy, efficient woodworking and carpentry. For literature on the complete Master line of fine rules, write to: Master Rule Co., Mulberry Street, Middletown, N. Y.

HOW TO INSTALL CEILING SHEETS, SINGLEHANDED



Joseph F. Boardman of 2 Lindsay Estate, Unanderra N.S.W., Australia, gets a "Tufboy" for this one.

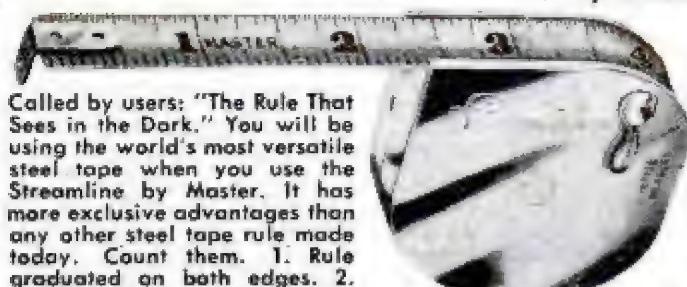
TO MAKE A SQUARE, USING A FOLDING RULE

Open up three sections (as indicated.) Then four sections. Then five sections. Butt open ends together. Point indicated is 90 degree angle. Raymond Stevenson, 21 W. Ohio St., Sharon, Pa., gets an X-6 for this one.

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... by Master



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British Information Services photo

Fuel-Saving Jet Engines For Trans-Atlantic Transport

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Meter Shows Photographer How to Take Portraits

Portraits can be taken by the amateur with almost any camera when he uses a handy meter. The meter is keyed to a series of portraits printed in the instruction book. The photographer simply selects the type of portrait he wants to take and instructions below the portrait give him shutter and lens settings, number and location of lights. Built into the meter is a telescoping rule and scales to show proper placement of lights.



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Only 'Vaseline' Cream Hair Tonic has it! Viratol—*the special compound that makes hair look natural, feel natural . . . stay in place for hours.

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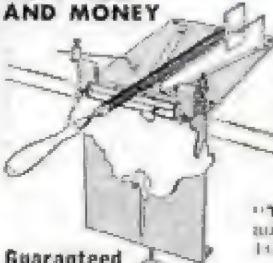
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SAVE TIME
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Guaranteed

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SHAW Mfg. Co.

Walking or Riding Tractors
14, 5, 8, 12 H.P. walking tractors.
Get just the power you need in
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traction machines. Dependable for nearly
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HYDRAULIC POWER
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It has Infinite Speeds 0 to 550, Reverse,
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Say You Saw It in Popular Mechanics

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MINIATURE ELECTRIC MOTORS. Run on 110 to 8 volt battery. Weight only 2 oz.; speed 2000 to 10,000 RPM, ground bearings, 3/32" shaft. BRAND NEW, with standard case. POSTPAID \$1.75 ea.

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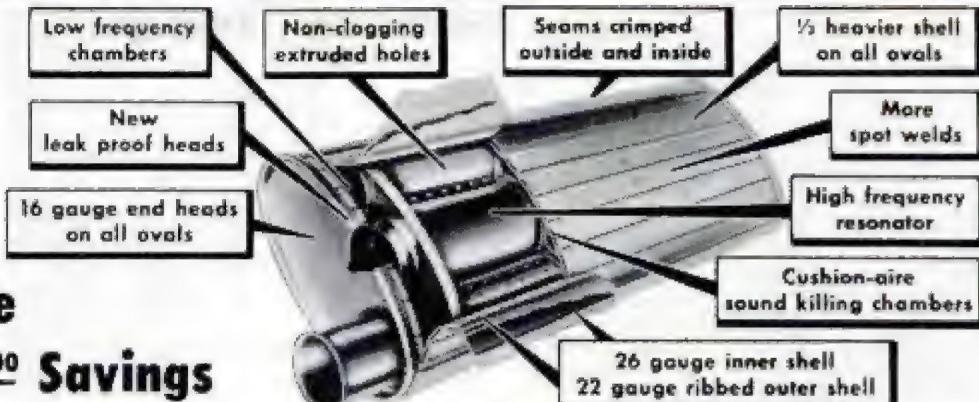
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These features show why Silentones are the highest quality mufflers. They're made to car factory specifications or better • scientifically designed to lower back pressure which robs your engine of

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Tuned for each make of car . . . costs less than "Hollywoods" • lower back pressure • more

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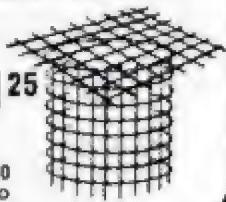
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OCTOBER 1953

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OWN GARAGE
DOOR...**

SAVE MONEY!

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PAPER PATTERN
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Provides Correct Speed and Power to Drill Up to 1 3/8"
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Amazing new internally geared speed reducer doubles drill press capacity. Greater power, greater efficiency, greater productivity.

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Exclusive GIL-BILT Build-It-Yourself Features

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- Floor model 34" high, table always stays level
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GIL-BILT 12-INCH BAND SAW

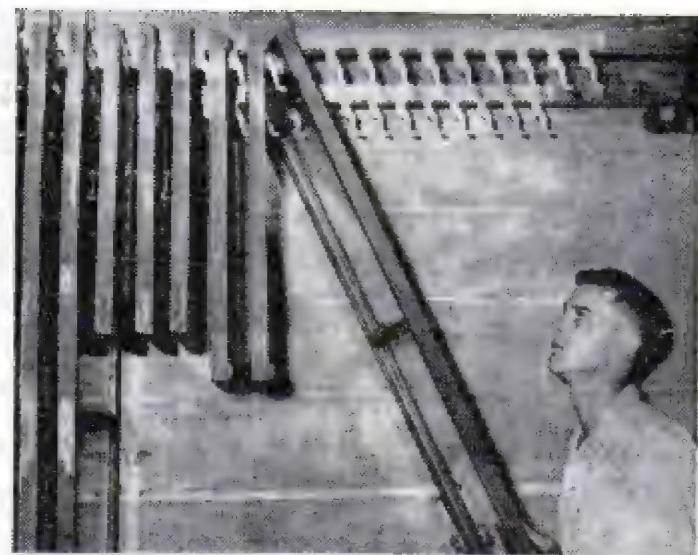
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CUTS BETTER • COSTS LESS!
 Accurate, fast; cuts smooth holes in hard or soft wood. Chrome vanadium steel blades, all chrome body. No. 250, $\frac{1}{2}$ "-1 1/2", \$1.89; No. 251, $\frac{1}{8}$ "-3", \$2.19. **GUARANTEED.**
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INVISIBLE MENDING KIT FOR PLASTIC
LARGE DOUBLE SIZE \$1.00 ppd.

FOR FURNITURE, INFLATED TOYS, RAIN-COATS, SEAT COVERS, WADING POOLS, CURTAINS, BABY PANTS, ETC.

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Molly Screw Anchors are a "must" for installing fixtures securely exactly where you want them—not where the studs are. Molly will hold where nails and screws won't—anywhere in any hollow wall construction. Mollys are neat, easy to use, inexpensive. And fixtures can be removed for cleaning and be replaced. Are they really good? More than 50 million have been installed without a complaint!

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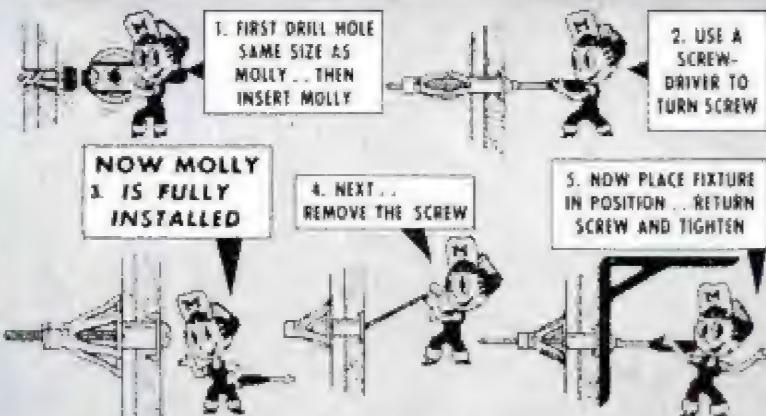


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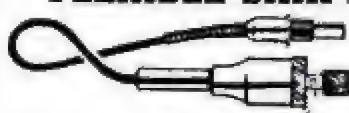
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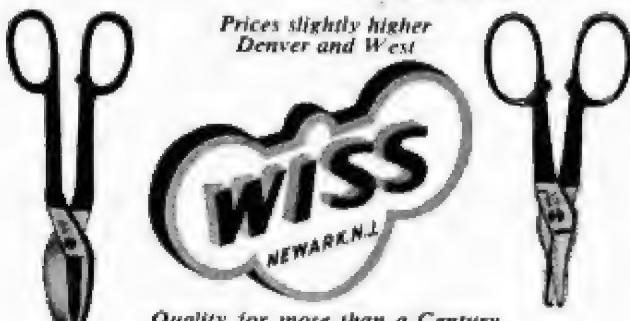
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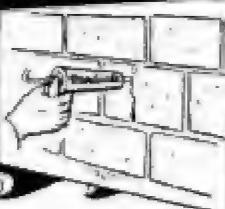
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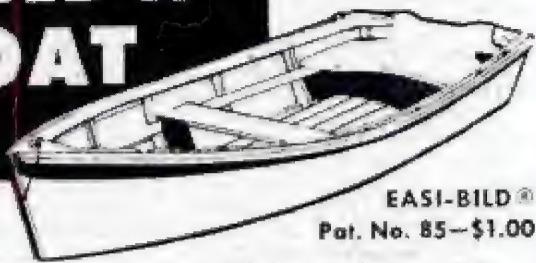
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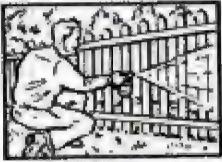
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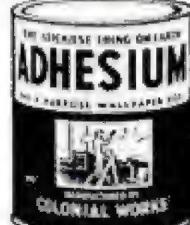
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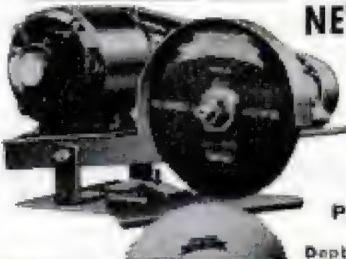
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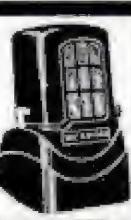
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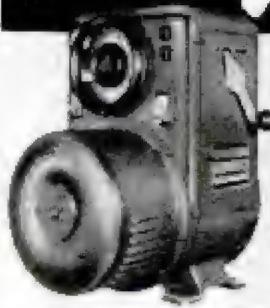
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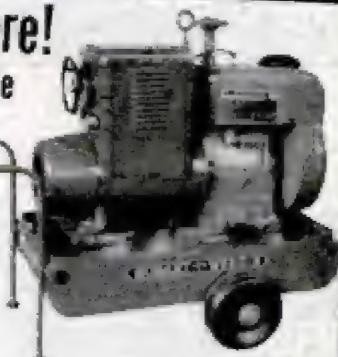
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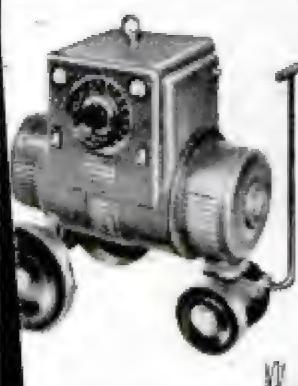
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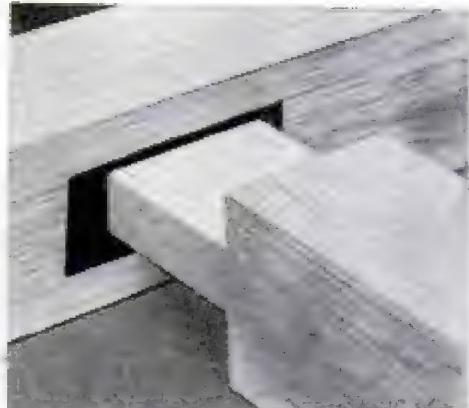
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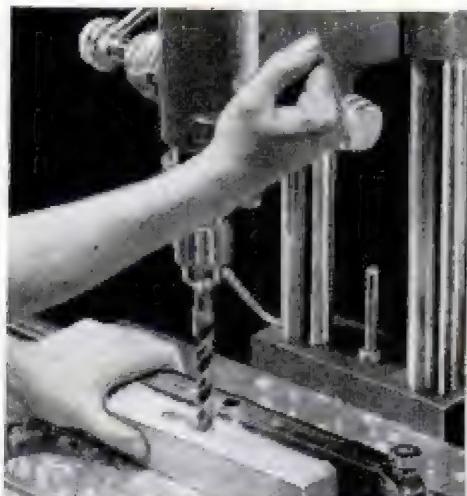
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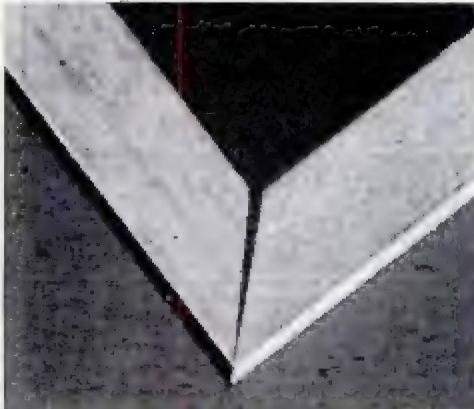
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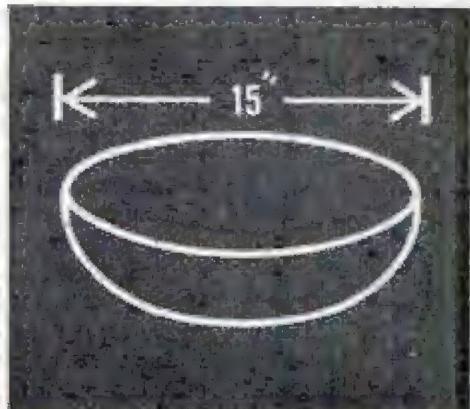
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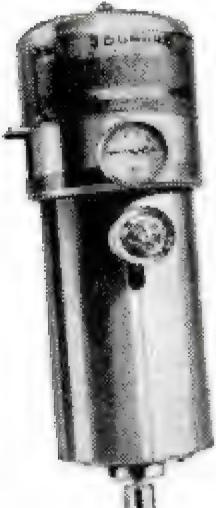
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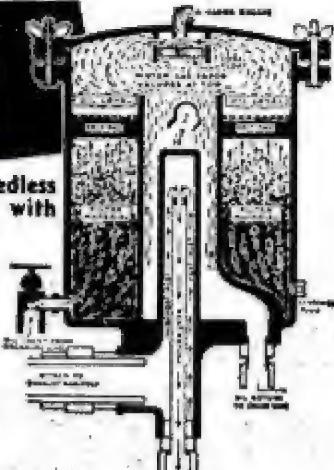
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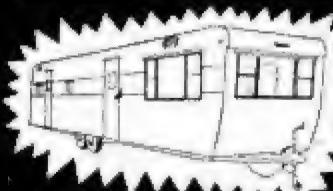
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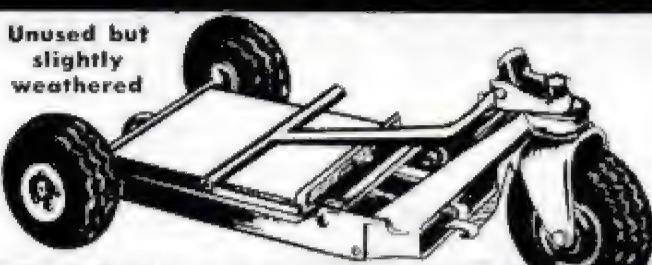
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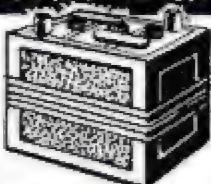
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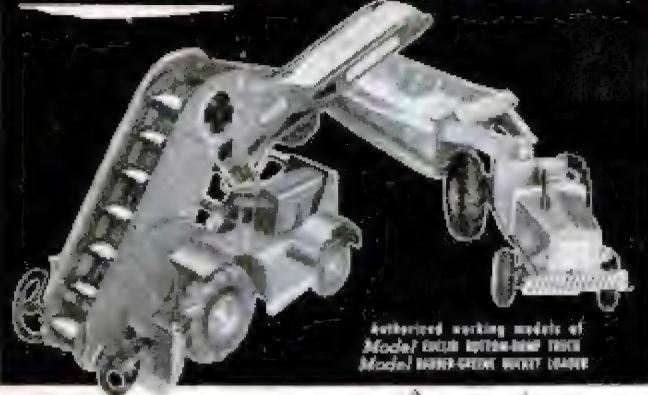


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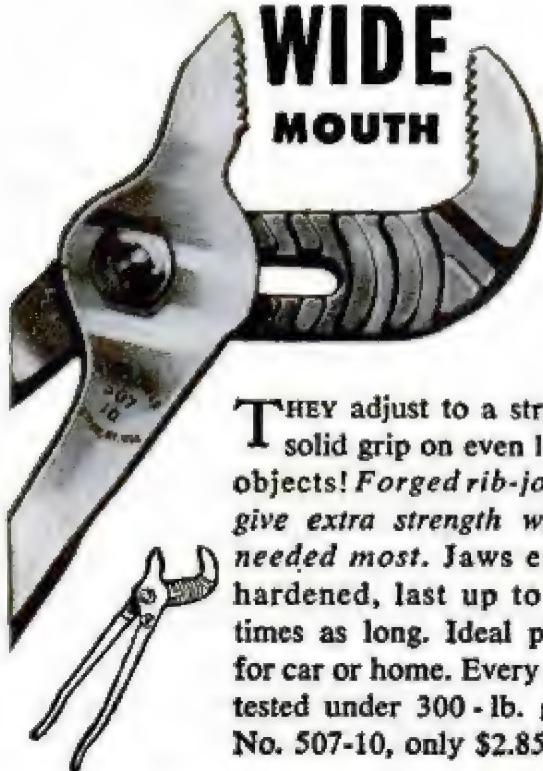
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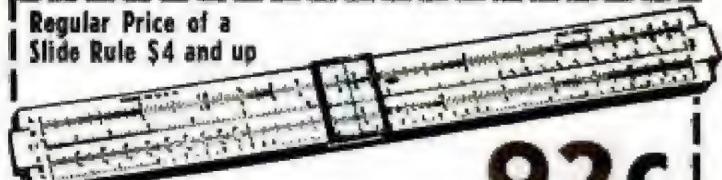
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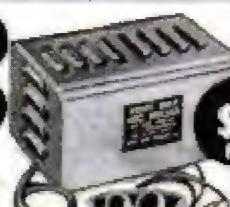
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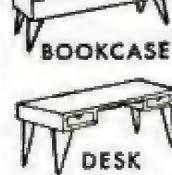
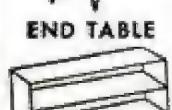
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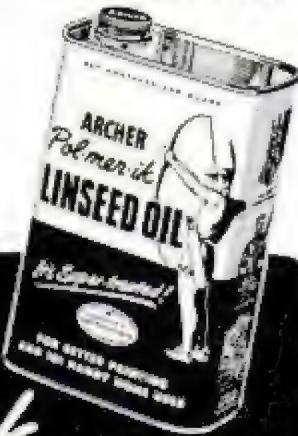
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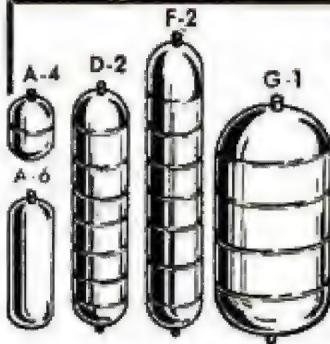


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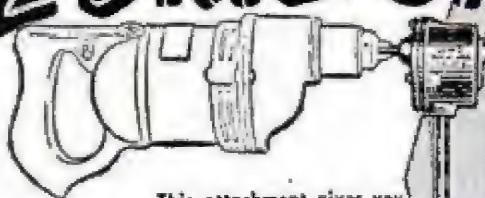
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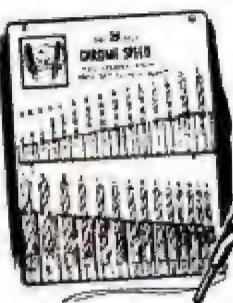
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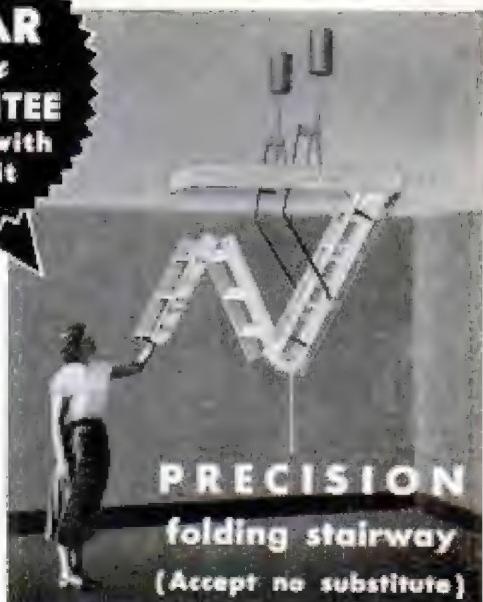
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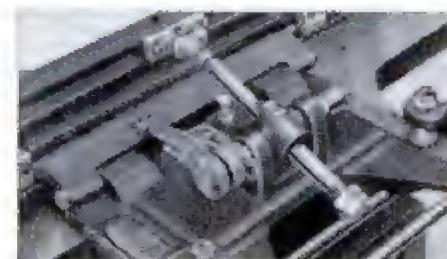
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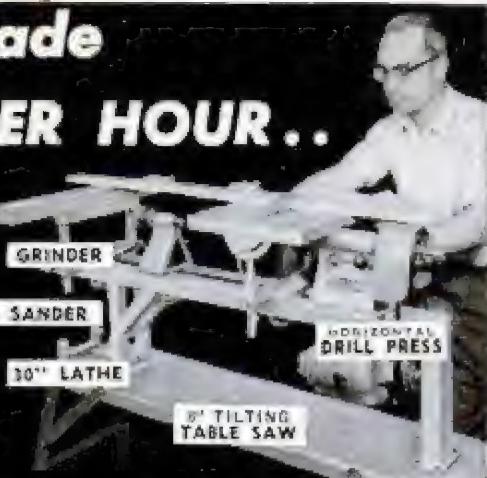
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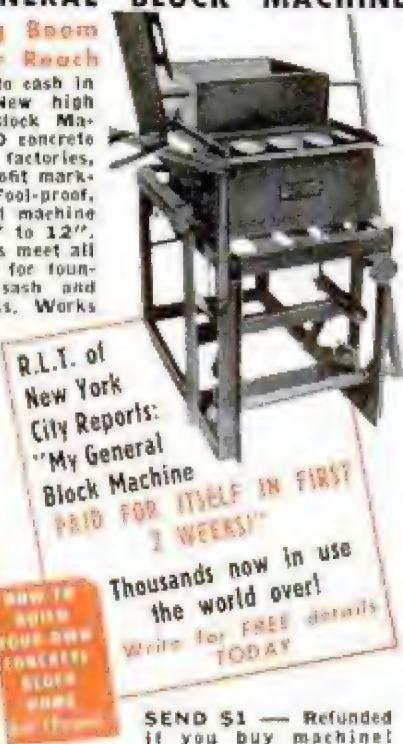
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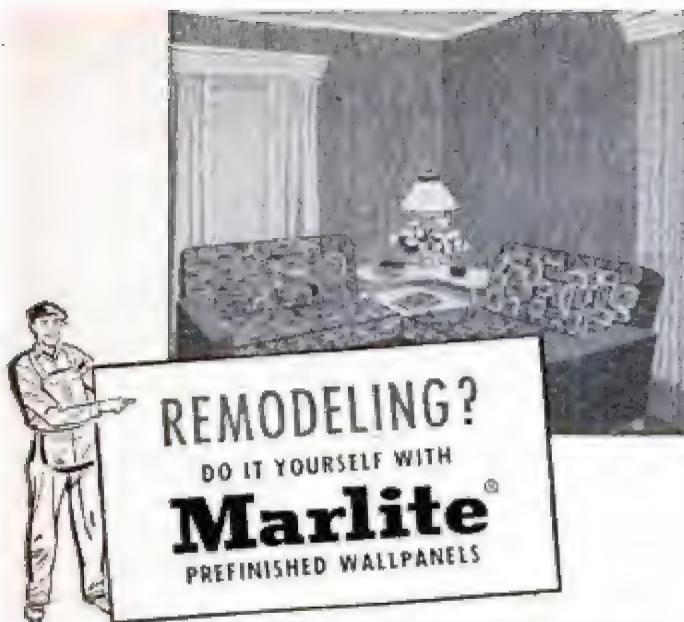
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3,000 Volts.

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Amperes.

RESISTANCE: 0 to 1,000
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Megohms.

CAPACITY: .001 to 1
Mfd. 1 to 50 Mfd.
(Quality test for elec-
trolytic).

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Ohms. 2,500 Ohms to
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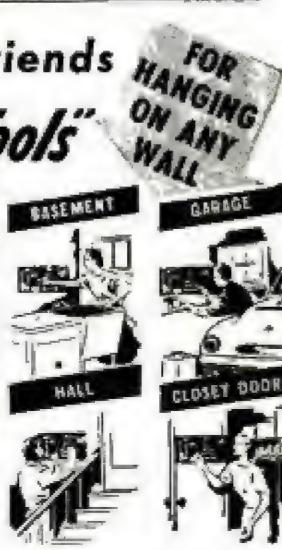
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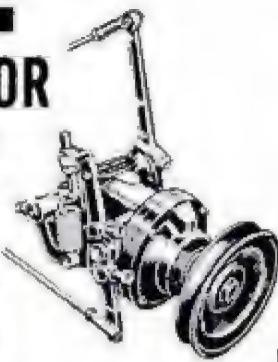
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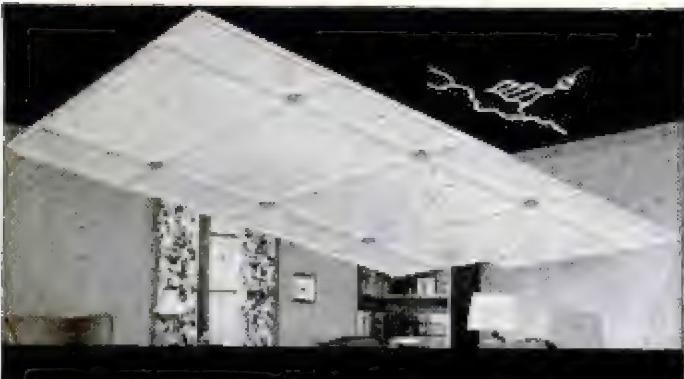
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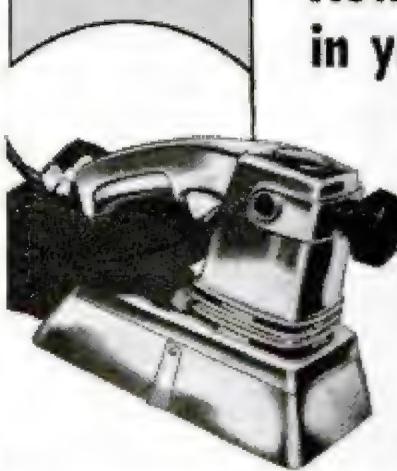
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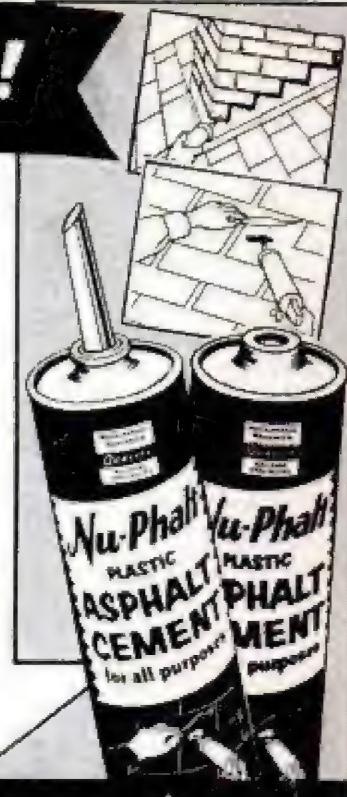
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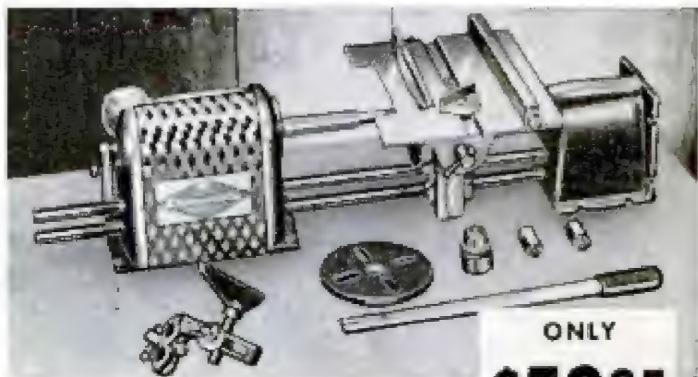
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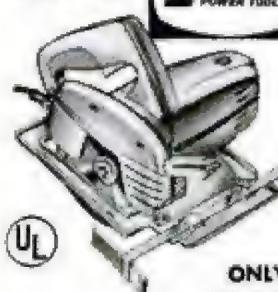


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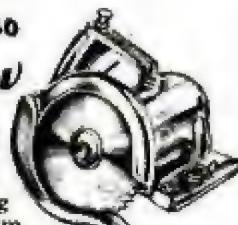
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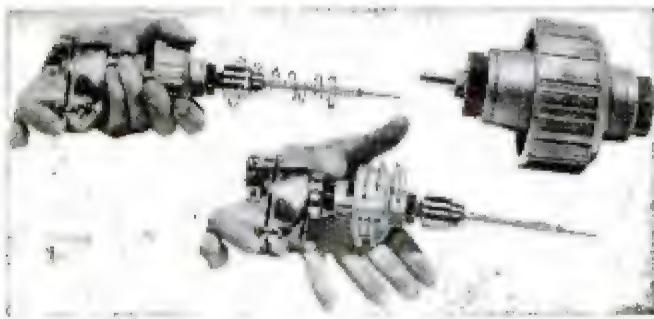
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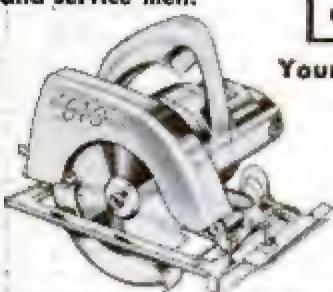
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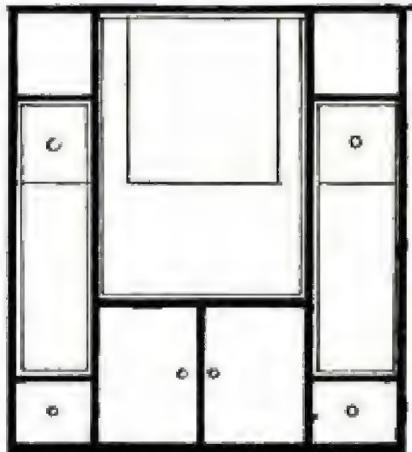
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EDITORS' IMPARTIAL TESTS PROVE:

New Self-Charging Battery Outlasts, Outperforms Others 221%

A few months ago, we started producing a new battery which we frankly believe to be many years ahead of its time. When we announced that this new battery developed 15 amperes more power than other batteries and would automatically bounce back to life again and again after being deliberately and completely discharged, technical editors of leading magazines raised their eyebrows.

We named it the *Lifetime* Battery—not because we expected it to last forever, or even the life of the owner—but because of its life (power) and the time it would last. We guaranteed it for six years; a test battery is still in daily use after 11 years! Editors said—and we don't blame them for being skeptical—"sounds too good to be true." One publisher even refused our advertising until he personally tested every claim we made.

One of the editors said: "Let us test this battery, any way we see fit. If it does what you claim, it's news our readers will be interested in. If it's no good, our readers will be interested in that, too, and that's the way we'll write the story." We said "go ahead" and they took a standard *Lifetime* Battery off the production line and went to work.

You may have read the result of the first test in a famous automotive magazine (name on request). Using two well-known batteries (possibly the best-known high-quality batteries in the world) for comparison, they first ran the *Lifetime* Battery down completely and let it re-charge itself automatically. They repeated this test 43 times the first day, then compared its strength with the other two batteries. Results: the *Lifetime* Battery was 204% stronger than the strongest of the other two batteries. They discharged the *Lifetime* Battery another 20 times, allowing it to re-charge itself automatically each time, and compared all batteries again: the *Lifetime* Battery was now 213% stronger than one battery, 221% stronger than the other! Next, they put a punishing 300-amp load on the *Lifetime* Battery; it survived that in good shape. So they repeated the self-recharging test again and finally concluded: "... unprecedented life expectancy... remarkable recuperative characteristics... outperformed the others in every respect and by a comfortable margin... an outstanding value."

The editor of another magazine (name on request) heard about the tests and asked to "give the thing a real test, one that would burn up the average battery." We gave him the same battery and challenged him to "finish it off." He installed it in his own car and drove the car on the battery alone, shifting gears as he would normally; until his "fingers were sore from holding the starter key... I hate to admit it, but I was outlasted by a battery."

Still another editor wrote: "... definite battery improvement... greater recuperative power, greater initial output... obviously high quality."

During independent tests in Alaska and the U.S., the *Lifetime* Battery was intentionally discharged under sub-freezing conditions, recharged itself automatically & started car at once!



Engineered for Cold Climates

Soon after the *Lifetime* Battery went into production, we selected a few dealers in northern U.S. and Alaska, shipped them a few batteries and waited to see how the dealers and the public would react. Our Alaska dealer told us that before presenting it to his customers, he was going to give the battery an Arctic test: discharge it completely then freeze it at 30 below zero for 72 hours. Result: the battery had recharged itself and immediately started the car. Immediately we received a telegraphed order from Alaska for \$6,043 worth of *Lifetime* Batteries!

6-Year Guarantee Saves You Up to \$107

The average deluxe battery lasts 1.4 years at a typical cost of \$25.00, or \$107.00 for a 6-year period. This arithmetic is making sense to people who are tired of throwing money away on batteries that just won't hold up. We believe it will make sense to you, too—particularly since the *Lifetime* Battery you buy now can easily be transferred to your new car whenever you trade in.

12-volt and 6-volt Available

Here's more arithmetic that makes sense: the *Lifetime* Battery sells in the U.S. at one price for all cars: \$29.95 for 6-volt, \$34.95 for 12-volt including excise tax.



Supply Limited: Order Today by Mail!

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- 6-volt (\$29.95 including tax)
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for _____ (make, model, year of car)

- I enclose cash, check, or money order; you pay shipping cost.
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Name _____

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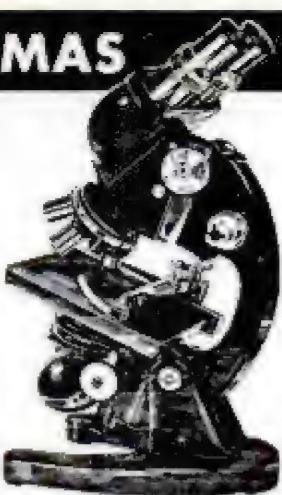
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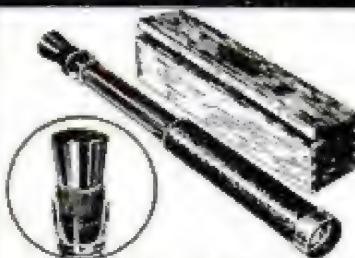
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POPULAR MECHANICS PRESS, 200 E. ONTARIO, CHICAGO 11

Popular Mechanics Home Improvement Help!



POPULAR MECHANICS PRESS, Dept. PM6, 200 E. Ontario St., Chicago 11

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Only ROTEX OFFERS these
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The B-T Hack Saw—powerful, portable, pocket size! Saws wood, plastic, steel and sheet metal, pipe, plaster board, celotex, ideal for scroll work. Full $\frac{5}{8}$ " chip clearance. Weighs only 11 oz., folds up into pocket or tool box with blade protected. A "must" for home craftsmen, electricians, carpenters, plumbers, etc.

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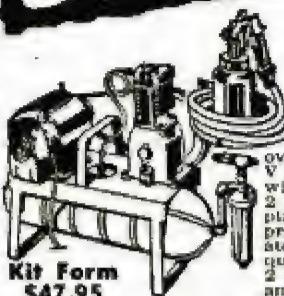
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BRAND NEW—For heating, ventilating, cooling, air washing, exhausting and forced draft. Quiet operating. Double wheel inlet, double width blower. 10" wheel; outlet 13 $\frac{1}{2}$ " x 11 $\frac{1}{2}$ ", inlet 8 $\frac{1}{2}$ ". Height 10". Width 18". Depth 18 $\frac{1}{2}$ ". C.F.M., 14 S.P. 1800; outlet vel. 1575; wt. 45 lbs. Blower With Motor and Drive **\$29.95**

Blower furnished with 1/2 h.p. motor, belt and pulleys. **\$45.00**



"WELLWORTH" 140 CFM

Single-inlet blower for heating, ventilating, exhausting, cooling, drying and similar applications. 3 $\frac{1}{2}$ " x 4" mounting flange with 2 $\frac{1}{2}$ " square discharge. 3 $\frac{1}{2}$ " diameter blower wheel powered by direct-connected 1/15 H.P., 110 V., 60 C. A.C. motor with constant base and 20" leads. 7 $\frac{1}{2}$ " wide less flange by 7 $\frac{1}{2}$ " H.P. 6 $\frac{1}{2}$ D. Ship. wt. 6 lbs. **#W2010**

50 CFM BLOWER—**#2020**

distaffler—**#2020**

SPRAY GUN VALUES

AIR CYLINDER and MOISTURE TRAP

5" x 8" tank, 400 lb. test with 1/4" air regulator, gauge, safety valve and shut-off cock. **#2053**. Ship. wt. 5 lbs. **\$12.95**

UTILITY PAINT CONTAINER
3-gallon Utility Pressure Paint Tank with hose and fittings. All steel tank lead coated and corrosion resistant. Doubles working area, saves time and effort. 6 in. opening for easier cleaning. Hung on ladder by hook-type handle. 10 ft. air hose and 10 ft. material hose. **#W24**. Shipping wt. 17 lbs. **\$19.95**

WELLWORTH SPRAY GUN
with 20 ft. Hose. Pressure feed type. Internal atomizing. One quart cup. Fan and round spray nozzle included. **#W20**. Wt. 3 lbs. **\$10.45**

Do it yourself Kits

AIR REGULATOR and EXTRACTOR

1/4" Air Regulator. Gauge and filter. Wt. 5 lbs. **#2050**. Now... **\$8.95**

#2051 Regulator and Gauge **5.95**

#2052 Air Filter only **3.25**

POP TYPE VALVES
150 lbs. pressure. Has a close range of closing after pop-off pressure is reached. 1/4" pipe thread. **#2054** **\$1.50**

1/4" Shut-off Valve for air or water—
Ship. wt. 1 lb. **#2055** **\$1.95**

Dash Pot Check Valve. Prevents leakage after pressure stops. Quiet operating.

1/4" **3.25**

3/8" **3.75**

1/2" **4.75**

5/8" **10.50**

1" **10.50**

AIR HOSE AND FITTINGS—Heavy Duty. 20 ft. with 1/4" fittings. Leak proof. Wt. 5 lbs. **#2059** **\$2.95**

With Air Chuck—
100 extra.

HEAVY DUTY TROUBLE-LITE CORD SET
Steel guard, flexible rubber handles. 2 tool outlet taps, service cord, male plug, guaranteed full length. Wt. 5 lbs. **#2083** **\$4.74**

WELLWORTH 1/4" REDUCING VALVE & GAUGE—Oil resistant, pressure 0- to -200 lb. Reduced pressure 0-to-75 lb. 1/4" outlets 1/4". Wt. 2 lbs. **#2056** **\$5.95**

AUTOMATIC PRESSURE SWITCHES

For Air or Water—Double pole, with 2-way release valve. For use on compressor units 1/4 to 3 h.p. Pressure range 20-200 lbs. 125-150 lbs. pressure. **#2060** **\$13.75**

Same without unloader. **#2061** **\$8.95**

20 to 40 lbs. adjustable to 80 lbs. for air or water. Wt. 2 lbs. **#2062** **\$6.50**

5000 Watt Electric Light Plant

Remote Control—Government Surplus Signal Corps Power Unit. Size of unit—16" long, 24" wide, 32" high. Net weight 875 lbs. Shipping weight 1000 lbs. Regular price was \$1,000.00. Now—white our supply lasts. **#500** **\$745.00**

All brand new equipment P.O.B. Chicago

2000 Watt Belt Driven Light Plant

2000 Watt, WW 4090-115 Volts. Weight 180 lbs. **\$299.50**

WW 4094-115/230 Volts. Weight 195 lbs. **\$325.00**

GENERATORS

Brand NEW 1952 Electric 2500 Watt Generator. Produces power for emergency or constant requirements. 120 volts, 60 cycle, single phase, 1800 r.p.m. Shipping weight 195 lbs. List Price \$420.00 SPECIAL PRICE ONLY **\$195.00**

Flock Gun and Insect Dust Sprayer

For dusting plants, shrubbery, etc. Easy-to-use, light weight for spraying powder insecticides. Invaluable for farms, homes and shops. Operates on Compressed Air. Requires 2 c.f.m. at 40 lbs. pressure. Approximately 14" in length. Weighs only 2 lbs. \$5.00 Value, only **\$2.95**

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AUTOMATIC COMPRESSOR UNIT with 22 Gal. Tank

A PORTABLE SPRAY OUTFIT for paint spraying, tire inflation, dust-cleaning, insecticide spraying, and 1001 uses on the FARM . . . in the HOME . . . in the FACTORY . . . wherever air pressure is required.

1/2 H.P. heavy duty capacitor motor, 110 volt A.C.; compressor 2" bore, 1 $\frac{1}{4}$ stroke, piston type, splash feed lubrication, 14" x 32" tank, automatic pressure switch, CFM 2.8 at 100 lbs. pressure. Check valve, safety valve, air regulator with gauge and filter, 20 ft. air hose with air chuck for inflating tires. V-belt drive. Ball bearing wheels with 2" x 2" rubber tires. Portable with handle. Ship. wt. 150 lbs. With 1 1/2 h.p. motor, reg. price \$124.50 item #W302 **\$98.50**

With 1 1/2 h.p. gas engine, reg. price \$200 item #W304 **\$124.50**

Regulator, gauge, and filter sold separately, price for the 3 items item #W303 **\$8.95**

72.50
Kit Form



WELLWORTH Compressor Outfit . . . Every FARM and HOME WORKSHOP

Both valves in head, bronze bearings, splash lubrication, "V" belt drive. Intake muffler and cleaner. Has 2" bore, 1 $\frac{1}{4}$ stroke, 2.8 cfm up to 150 lbs. pressure. Motor required: 1/4 h.p. at 150 lbs. or equivalent gas engine. Guaranteed!

Includes: Compressor, pressure tank, air gauge, air chuck, 20-ft. hose, pop-valve, copper tubing, with 4 brass flared fittings for connecting compressor to tank, 4-way cross and 3 nipples. Complete Outfit, wt. 30 lbs. **\$32.45**

With 6" x 24" tank—**#W259** **\$38.50**

With 12 1/2" x 24" tank—**#W820** **\$20.50**

Compressor only—**#W800**—wt. 16 lbs. **\$12.45**

Equipment less Compressor—**#W812**—wt. 14 lbs. **\$12.45**



WELLWORTH COMPRESSORS

Single Cylinder Compressor

Cool-Flo Cylinder Head; Stainless Steel Valves; Solid Brass Valve Retainers; Aluminum Piston; Three Piston Rings. One Year Guarantee. Ship. wt. 24 lbs. You Save 21 1/2%—**#W200** **\$29.95**

Bargain — Twin Cylinders

Aluminum Alloy Connecting Rods; Positive Lubrication; Sure Seal

Unicast Cylinder and Crankcase; Solid-steel cast Crankshaft. Drag-on-type Bronze Bushings. One Year Guarantee. Ship. wt. 40 lbs. Model **W-7** **\$59.95**

Model 16 SPRAY GUN

With model 81-500 qt. attachable siphon cup. Furnished with 4 1/4 or 8 c.f.m. nozzle. **#W16** **\$42.20**

Shipping wt. 3 1/2 lbs. **\$30.50**

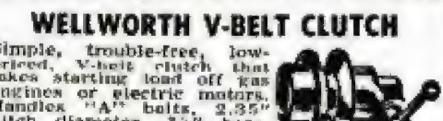
Model 19 SPRAY GUN

With model 81-500 qt. attachable siphon cup. Furnished with 4 or 8.4 c.f.m. nozzle. **#W19** **\$36.45**

Shipping wt. 3 1/2 lbs. **\$30.50**

WELLWORTH Model 2600 W SPRAY GUN

Furnished with 4 spray nozzles—1 fluid nozzle. For spraying all types of materials, both slow or quick drying, such as house paint, lacquers, varnishes, water paints, whitewash, dyes, etc. furnished with both internal and external nozzle assemblies. Designed for use with Portable Compressors, internal and external nozzles are quickly and easily interchangeable on the same head. Supplied with 1 qt. cup. Nozzles use approximately 2 to 4 C.F.M. The air nozzle (internal atomizing) has an adjustable fan spray of from 4" to 8" at 35 to 45 lbs. pressure. Complete—**\$14.95**



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Simple, trouble-free, low-priced, V-belt clutch that takes starting load off gas engines or electric motors. Handles "A" belts, 2-3/8" pitch diameter, 3/8" bore. Ideal for use with lawn mowers, garden tractors, home workshop motors, etc. Clutch **(25 A)** Ea. **\$7.50**

Same clutch furnished with 3/4" bore **\$8.50**

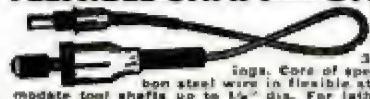
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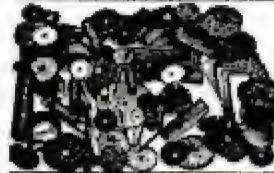
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for grinding, sanding, de-
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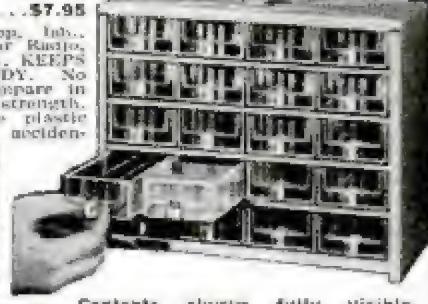
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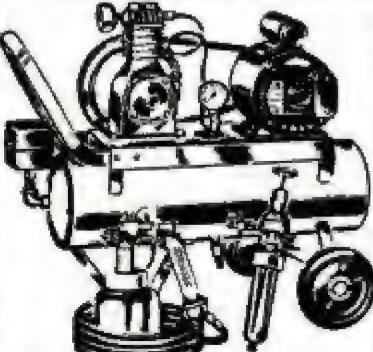
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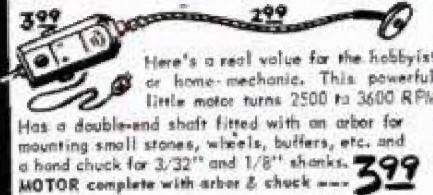
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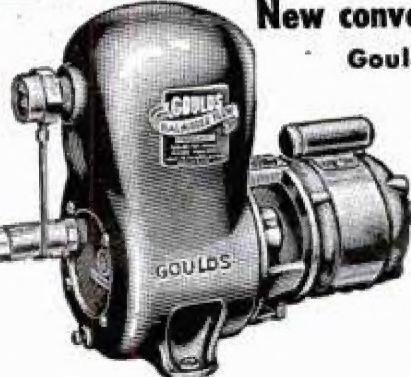


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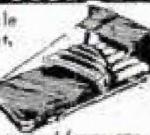
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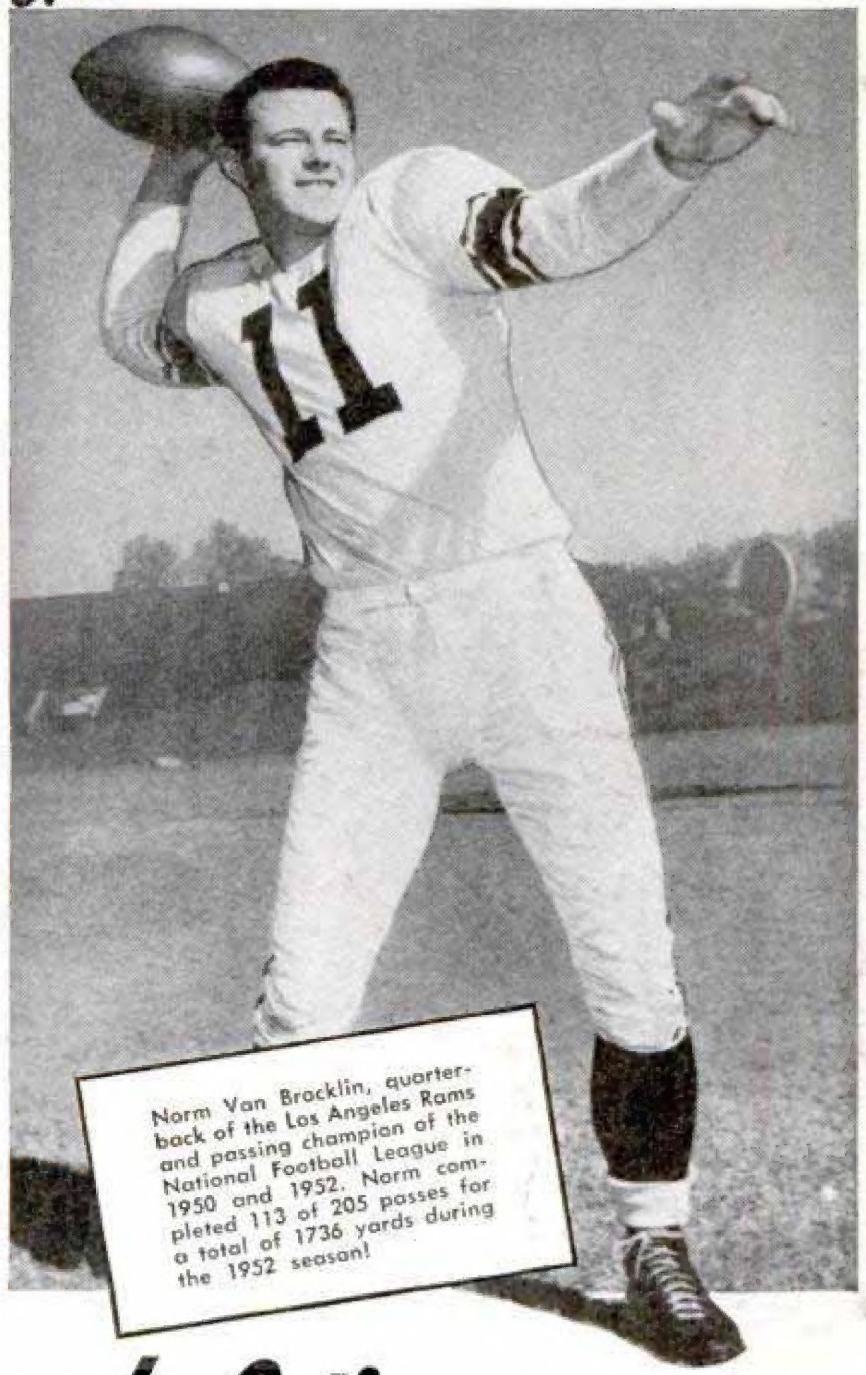
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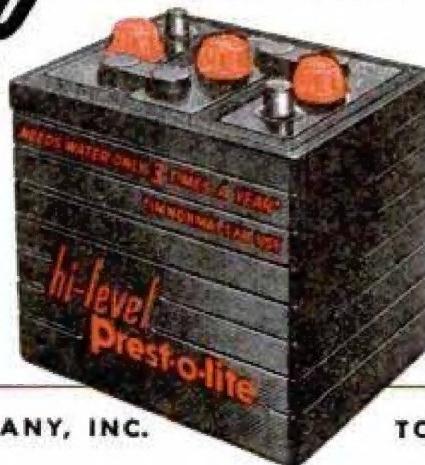
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